SOIL SURVEY OF

Rapides Parish, Louisiana

United States Department of Agriculture
Soil Conservation Service and
Forest Service
In cooperation with
Louisiana Agricultural Experiment Station

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and agencies of the States, usually the Agricultural Experiment Stations. In some surveys, other Federal and local agencies also contribute. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all who need the information, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in the period 1965–71. Soil names and descriptions were approved in 1972. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1971. This survey was made cooperatively by the Soil Conservation Service, the Forest Service, and the Louisiana Agricultural Experiment Station. It is part of the technical assistance furnished to the Lower West Red River, Lower East Red River, and Calcasieu Soil and Water Conservation Districts.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing farms and woodlands; in selecting sites for ponds, roads, buildings, and other structures; and in judging the suitability of tracts of land for farming, industry, and recreation.

Locating Soils

All of the soils of Rapides Parish are shown on the detailed map at the back of this publication. This map consists of many sheets made from aerial photographs. Each sheet is numbered to correspond with a number on the "Index to Map Sheets."

On each sheet of the detailed map, soil areas are outlined and are identified by symbols. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise it is outside, and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information. This guide lists all of the soils of the parish in alphabetic order by map symbol and gives the capability classification of each. It also shows the page where each soil is described.

Individual colored maps showing the relative suitability or degree of limitation of soils for many specific purposes can be developed by using the soil map and the information in the text. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils from the soil descriptions.

Foresters and others can refer to the section "Woodland," where the soils of the parish are grouped according to their suitability for trees.

Game managers, sportsmen, and others can find information about soils and wildlife in the section "Wildlife."

Engineers and builders can find, under "Engineering Uses of the Soils," tables that contain estimates of soil properties and information about soil features that affect engineering practices.

Scientists and others can read about how the soils formed and how they are classified in the section "Formation and Classification of Soils."

Newcomers to Rapides Parish may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the information about the parish given in the section "General Nature of the Parish."

Cover: Slash pine plantation on a Ruston fine sandy loam in Rapides Parish.

Contents

Issued March 1980

Index to Mapping Units

Summary of Tables

SOIL SURVEY OF RAPIDES PARISH, LOUISIANA

BY ALEXANDER KERR, JR., BILLY J. GRIFFIS, JOHN W. POWELL, JIMMY P. EDWARDS, AND RONNIE L. VENSON, SOIL CONSERVATION SERVICE; JOHN K. LONG, FOREST SERVICE; AND WAYNE W. KILPATRICK, LOUISIANA AGRICULTURAL EXPERIMENT STATION [1]

UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE AND FOREST SERVICE, IN COOPERATION WITH THE LOUISIANA AGRICULTURAL EXPERIMENT STATION

RAPIDES PARISH is in the central part of Louisiana (fig. 1). The total area of the parish is 871,467 acres, 17,601 acres of which is lakes, bayous, and the Red River. In 1970 the population totaled 118,078.

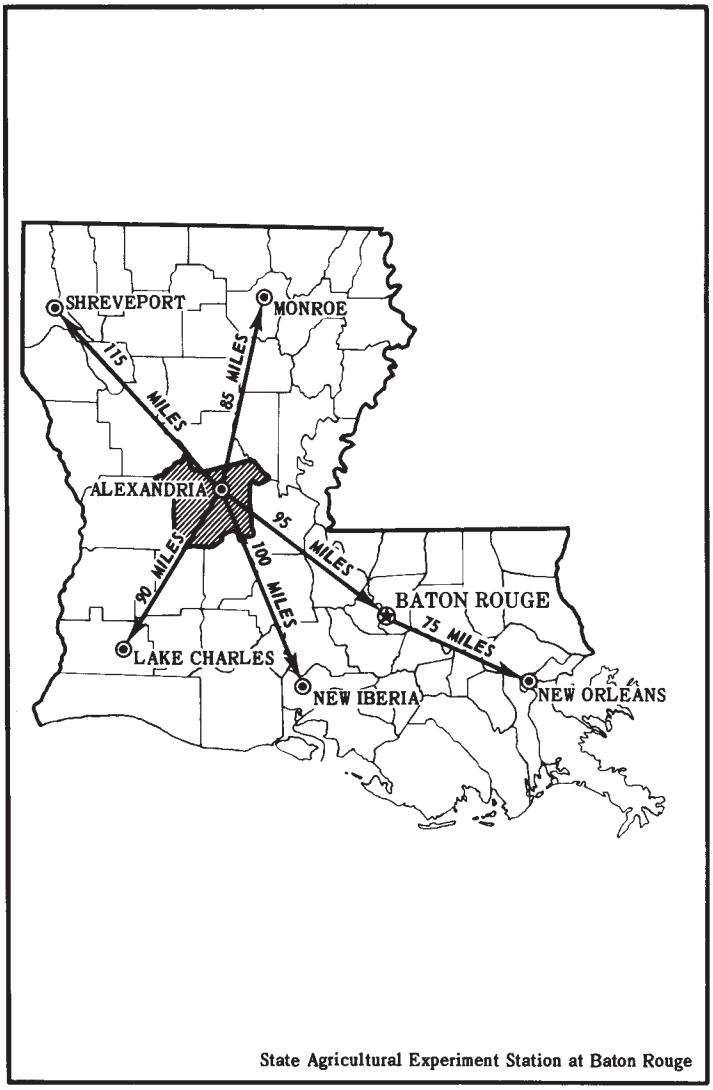


Figure 1.—Location of Rapides Parish in Louisiana.

This parish consists of four major physiographic areas: (1) the nearly level Red River alluvial plain, (2) the nearly level upland drainageways, (3) the gently sloping uplands, and (4) the strongly sloping uplands.

The soils of the nearly level Red River alluvial plain formed in sediment deposited by the Red River. Former channels of the Red River, now inactive, are Bayou Rapides, Bayou Boeuf, Bayou Latanier, and Bayou Jean de Jean. Most of the soils along the natural levees of the Red River or its former channels are loamy, have high natural fertility, and are very productive. They have been used extensively for cotton, corn, sugarcane, and soybeans for many years. In the low areas between the natural levees, the soils are clayey. Most of the clayey soils have been cleared in recent years and are in pasture and crops, principally soybeans. Some rice is grown. These soils have high natural fertility. Drainage is needed on the clayey soils for both crops and pasture. Some areas are subject to flooding.

The soils in the nearly level upland drainageways formed in loamy sediment deposited by streams that drain the uplands. The major streams are the Calcasieu River, Flagon Bayou, and Spring Creek. The soils have low natural fertility. They are mostly wooded. Most of the area is subject to flooding.

The gently sloping uplands are at a higher elevation than the Red River alluvial plain and are in the southern and northeastern parts of the parish. Most of the area is wooded. The area is dissected by many small drainageways. The soils are loamy or clayey. They have low natural fertility but respond well to fertilization. Most of the soils in this area are wet.

The strongly sloping uplands are in the northwestern part of the parish. They are deeply dissected by many drainageways. The soils range from acid to alkaline and from clay to deep sand. They have low natural fertility and are generally too steep for crops. Most of the acreage is in pine. Natural drainage is good. Erosion is a hazard when plant cover is removed.

[1] Assisting in the survey were C. LARRY BUTLER, B. ARVILLE TOUCHET, and CHARLES E. MARTIN, Soil Conservation Service, United States Department of Agriculture.

How This Soil Survey Was Made

Soil scientists made this survey to learn what kinds of soils are in Rapides Parish, where they are located, and how they can be used. The soil scientists went into the parish knowing that they would probably find many familiar soils and possibly some unfamiliar ones. They observed the steepness, length, and shape of slopes, the size and speed of streams, the kinds of native plants or crops, the kinds of rock, and many facts about the soils. They dug or bored many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down to the parent material that has not been changed greatly by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and compared them with others in nearby parishes and in more distant places. They also referred to the more general soil survey of Rapides Parish published in 1916 (*8*).[2] They classified and named the soils according to nationwide, uniform procedures. The *soil series* and the *soil phase* are the categories of soil classification most used in a local survey (*9*).

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all of the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Ruston and Norwood, for example, are the names of two soil series. All of the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface layer and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Moreland clay, frequently flooded, is one of several phases within the Moreland series.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was prepared from these aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly equivalent, however, because it is not practical to show on such a map all the small, scattered bits of a given soil that have been seen within an area that consists mostly of a recognized soil phase.

Some mapping units are made up of soils of different series, or of different phases within one series. Two such kinds of mapping unit are shown on the soil map of Rapides Parish: soil complexes and soil associations.

A soil complex consists of areas of two or more soils, so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area of a complex contains some of each of the two or more dominant soils, and the pattern and relative proportions are about the same in all areas. Generally, the name of a soil complex consists of the names of the dominant soils, joined by a hyphen. Rexor-Nugent complex, frequently flooded, is an example.

A soil association is made up of adjacent soils that occur as areas large enough to be shown individually on the soil map but are shown as one unit because the amount of time and effort needed to delineate them separately cannot be justified. There is a considerable degree of uniformity in pattern and relative extent of the dominant soils, but the soils may differ greatly. The name of an association consists of the names of the dominant soils, joined by a hyphen. Vaiden-Watsonia association, rolling, is an example.

While a soil survey is in progress, soil scientists take soil samples needed for laboratory measurements and for engineering tests. Laboratory data from the same kind of soil in other places are also assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kind of soil. Yields under defined management are estimated for all soils.

Soil scientists observe how soils behave when used as a growing place for native and cultivated plants, and as material for structures, foundations for structures, or covering for structures. They relate this behavior to properties of the soils. For example, they observe that filter fields for onsite disposal of sewage fail on a given kind of soil, and they relate this to the slow permeability of the soil or its high water table. They see that streets, road pavements, and foundations for houses are cracked on a particular kind of soil, and they relate this failure to the high shrink-swell potential of the soil material. Thus, they use observation and knowledge of soil properties, together with available research data, to predict limitations or suitability of soils for present and potential uses.

After data have been collected and tested for the key, or benchmark, soils in a survey area, the soil scientists set up trial groups of soils. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others. They then adjust the groups according to the results of their studies and consultations. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under current methods of use and management.

General Soil Map

The general soil map at the back of this survey shows, in color, the soil associations in Rapides Parish. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil. It is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to those

[2] Italic numbers in parentheses refer to References, p. 84.

who want a general idea of the soils in the parish, who want to compare different parts of the parish, or who want to know the location of large tracts that are suitable for a particular kind of land use. Such a map is a useful general guide in managing a watershed, a wooded tract, or a wildlife area, or in planning engineering works, recreational facilities, and community developments. It is not a suitable map for planning the management of a farm or field, or for selecting the exact location of a road, building, or similar structure, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect their management.

The soil associations in Rapides Parish are discussed in the following pages.

The soil associations in this survey have been grouped into four general kinds of landscape for broad interpretative purposes. Each of the broad groups and their included soil associations are described in the following pages. The terms for texture used in the titles of the associations refer to the surface layer and subsoil unless otherwise stated.

Nearly Level Soils on the Red River Alluvial Plain

These soils are loamy and clayey. The loamy soils are on natural levees of the Red River and its former channels and on high positions on the alluvial plain; the clayey soils occupy low positions. These soils formed in sediment deposited by the Red River and its distributaries. A manmade levee system protects most areas from floodwaters of the Red River. Elevation is about 36 to 90 feet above sea level. Some of these soils are subject to flooding. The four associations in this group make up 27 percent of the parish.

1. Norwood association

Nearly level, alkaline, loamy soils

This association is on the Red River alluvial plain on natural levees of the Red River, Bayou Boeuf, and Bayou Rapides. It consists of loamy soils. Slopes are less than 1 percent. Elevation is dominantly 60 to 90 feet above sea level.

The association makes up about 10 percent of the parish. It is about 86 percent Norwood soils and 14 percent Latanier and Roxana soils.

Norwood soils are well drained and have moderate permeability. The surface layer is reddish-brown silt loam or silty clay loam. The underlying material is reddish-brown, stratified, calcareous very fine sandy loam, silt loam, and silty clay loam.

Most of this association is in cropland. Cotton, corn, soybeans, and sugarcane are the principal crops. A small acreage is used for pasture, homesites, and other nonfarm purposes. The city of Alexandria is in this association. Farms are mostly 200 to 800 acres in size, and many are privately owned.

The soils of this association are well suited to most crops and pasture plants grown in the area. High natural fertility, loamy texture, and nearly level slopes make these soils among the most productive in the parish. Drainage is needed in places for optimum production of cultivated crops. Low strength is a limitation for some nonfarm uses. Near towns the trend in land use is toward residential, commercial, and other nonfarm uses.

2. Gallion association

Nearly level, acid, loamy soils

This association is on the Red River alluvial plain on the natural levee of Bayou Latanier. It consists of loamy soils. Slopes are less than 1 percent. Elevation is dominantly 60 to 65 feet above sea level.

The association makes up less than 1 percent of the parish. It is about 58 percent Gallion soils and 42 percent Moreland and Latanier soils.

Gallion soils are well drained and have moderate permeability. The surface layer is dark-brown silt loam or silty clay loam.

Most of this association is in cropland. The principal crops are cotton, corn, and soybeans. A small acreage is in pasture. Farms are mostly about 100 to 200 acres in size, and most are privately owned.

The soils of this association are well suited to most crops and pasture plants grown in the parish because of their loamy texture and nearly level slopes. Drainage is needed in some places for optimum production of crops. Low strength is a limitation for some nonfarm uses.

3. Moreland-Latanier association

Nearly level, alkaline, clayey soils

This association is on the Red River alluvial plain on broad flats adjacent to natural levees. It consists of clayey soils. Slopes are less than 1 percent. Elevation is 65 to 85 feet above sea level.

The association makes up about 9 percent of the parish. It is about 72 percent Moreland soils, 23 percent Latanier soils, and 5 percent Norwood soils.

Moreland soils are somewhat poorly drained and have very slow permeability. They occupy low positions on the landscape. The surface layer is dark reddish-brown clay. The subsoil is dark reddish-brown, calcareous silty clay.

Latanier soils are somewhat poorly drained and have very slow permeability. They occupy the high positions on the landscape. The surface layer and subsoil are dark reddish-brown clay. They are underlain by stratified, light reddish-brown, calcareous, loamy alluvial sediment.

Most of this association is wooded, in pasture, and in crops. Farms are mostly about 200 to 500 acres in size, and most are privately owned.

The soils of this association are suited to most crops and pasture plants grown in the parish, especially soybeans and rice. Drainage is needed for crops and pasture. High to very high shrink-swell potential, low strength, and wetness are the main limitations. The trend in land use is toward clearing for soybean and rice production.

4. Moreland association

Nearly level, alkaline, clayey soils that are subject to flooding

This association is at low elevations on the Red River alluvial plain. It consists of clayey soils that are sub-

ject to flooding. Slopes are less than 1 percent. Elevation is 36 to 65 feet above sea level.

The association makes up about 7 percent of the parish. It is about 85 percent Moreland soils and 15 percent Latanier and Perry soils.

Moreland soils are somewhat poorly drained and have very slow permeability. The surface layer is dark reddish-brown clay. The subsoil is dark reddish-brown, calcareous silty clay.

Most of this association is wooded, in privately owned farms about 200 to 500 acres in size.

The soils of this association are not suited to crops or to most pasture plants, because of the hazard of flooding. Flooding, very high shrink-swell potential, low strength, and wetness are the main limitations.

Nearly Level Soils in Upland Drainageways

These soils formed in loamy sediment deposited by streams that drain the uplands. Elevation is about 90 to 150 feet above sea level. Most of these soils are subject to flooding. Only one association is in this group. It makes up 15 percent of the parish.

5. Guyton association

Nearly level, loamy soils that are subject to flooding

This association is in drainageways on the uplands. It consists of loamy soils. Slopes are less than 1 percent. Elevation is about 90 to 150 feet above sea level.

The association makes up about 15 percent of the parish. It is about 62 percent Guyton soils and 38 percent Alligator, Cahaba, Wrightsville, Acadia, Foley, Urbo, Nugent, and Rexor soils.

Guyton soils are poorly drained and have slow permeability. The surface layer is grayish-brown and light brownish-gray silt loam. The subsoil is grayish-brown silty clay loam.

Most of this association is in mixed pine and hardwood trees. Hardwoods dominate in the more depressed areas. A small acreage is in pasture.

The soils of this association are well suited to pines and hardwoods. Most of this association is owned by timber companies and the Federal Government. The Kisatchie National Forest is the federally owned part.

They are poorly suited to crops and fairly well suited to pasture. Flooding and wetness are the main limitations.

Mainly Nearly Level to Gently Sloping Soils on Uplands

These loamy and clayey soils are on uplands on both sides of the Red River alluvial plain. They are dissected by many small drainageways. These soils are mainly nearly level to gently sloping, but along some streams they are moderately sloping, and in some places they are strongly sloping. Slopes are 0 to 12 percent. Elevation is about 75 to 136 feet above sea level. The three associations in this group make up 30 percent of the parish.

6. Beauregard-Caddo association

Nearly level to very gently sloping, loamy soils

This association is mostly in the southwestern part of the parish. It consists of loamy upland soils. Slopes are 0.5 to 3 percent. Elevation is about 120 to 200 feet above sea level.

The association makes up about 13 percent of the parish. It is about 54 percent Beauregard soils, 22 percent Caddo soils, and 24 percent Malbis, Gore, McKamie, Acadia, Kolin, and Glenmora soils.

Beauregard soils are very gently sloping and are in broad areas. These soils are moderately well drained and have slow permeability. The surface layer is dark grayish-brown silt loam. The subsoil is yellowish-brown silty clay loam mottled with red and gray. It contains plinthite.

Caddo soils are nearly level and are in low, broad flats or depressed areas. These soils are poorly drained and have slow permeability. The surface layer is grayish-brown silt loam. The subsurface layer is thick, light-gray silt loam. The subsoil is light-gray silty clay loam mottled with brown and red.

Most of this association is wooded in large tracts owned by timber companies. A few small dairy farms are in this association.

The soils of this association are well suited to woodland and pasture. Wetness and low strength are the main limitations.

7. Acadia-Kolin association

Nearly level to gently sloping loamy soils that have a clayey subsoil

This association is mostly in the eastern part of the parish, north of the Red River. It consists of loamy upland soils that have a clayey subsoil. Slopes are 0.5 to 5 percent. Elevation is about 80 to 130 feet above sea level.

The association makes up about 9 percent of the parish. It is about 37 percent Acadia soils, 36 percent Kolin soils, and 27 percent Wrightsville, Libuse, Gore, and Crowley soils and Paleudalfs.

Acadia soils are nearly level to very gently sloping and are on broad flats and side slopes. These soils are somewhat poorly drained and have very slow permeability. The surface layer is dark grayish-brown silt loam. The upper part of the subsoil is yellowish-brown and light brownish-gray silt loam, and the lower part of the subsoil is gray clay and silty clay.

Kolin soils are very gently sloping to gently sloping and are on ridgetops. These soils are moderately well drained and have very slow permeability. The surface layer is dark grayish-brown silt loam. The upper part of the subsoil is strong-brown silty clay loam mottled with red and brown, and the lower part is strong-brown and red clay mottled with gray.

Most of this association is wooded and in pasture. A small acreage is used for crops, homesites, and other nonfarm purposes. Much of the area is in large tracts owned by timber companies.

The soils of this association are well suited to woodland and pasture. The Kolin soils are fairly well suited to crops. The high shrink-swell potential of the clayey subsoil, low strength, and wetness are the main limitations.

8. Gore association

Very gently sloping to moderately sloping, loamy soils that have a clayey subsoil

Most of this association is adjacent to streams that drain the uplands. It consists of upland soils that have a loamy layer and a clayey subsoil. The soils are mainly very gently sloping to moderately sloping but are strongly sloping in some places. Slopes are 1 to 12 percent.

The association makes up about 8 percent of the parish. It is about 93 percent Gore soils and 7 percent Libuse and McKamie soils.

Gore soils are moderately well drained and have very slow permeability. The surface layer is brownish very fine sandy loam. The subsoil is red clay mottled with gray.

Most of this association is wooded. Most of the area is owned by timber companies.

The soils of this association are well suited to woodland. The very high shrink-swell potential of the clayey subsoil and low strength are the main limitations.

Mainly Gently Sloping to Moderately Steep Soils on Uplands

These loamy and clayey soils are on uplands that are deeply dissected by many drainageways. The loamy soils mostly occupy high positions, and the clayey soils occupy low positions. The soils are mainly gently sloping to moderately steep, but range from very gently sloping to steep. They are mainly in the northwestern and western parts of the parish. Elevation is about 130 to 290 feet above sea level. Slopes are 1 to 30 percent. Small areas of outcrops of soft rock are on some of the steeper slopes. The four associations in this group make up 28 percent of the parish.

9. Ruston-Malbis association

Very gently sloping to moderately sloping, loamy soils

This association is in the northern and western parts of the parish. It consists of loamy upland soils. Slopes are 1 to 8 percent. Elevation is about 180 to 200 feet above sea level.

The association makes up about 15 percent of the parish. It is about 56 percent Ruston soils, 33 percent Malbis soils, and 11 percent Lucy, Smithdale, Eustis, Cadeville, and Cahaba soils.

Ruston soils are very gently sloping to moderately sloping and are on ridges and upper parts of side slopes. These soils are well drained and have moderate permeability. The surface layer is dark grayish-brown fine sandy loam. The subsoil is red sandy clay loam.

Malbis soils are very gently sloping to gently sloping and are mostly on side slopes. These soils are moderately well drained and have moderately slow permeability. The surface layer is dark grayish-brown very fine sandy loam. The subsoil is yellowish-brown sandy clay loam that contains plinthite.

Most of this association is in pine trees. A small acreage is used for homesites. Most of this area is owned by timber companies and the Federal Government. The Kisatchie National Forest is the federally owned part.

The soils in this association are well suited to woodland. Crops and pasture are also suited. Slope is the main limitation.

10. Smithdale association

Strongly sloping to moderately steep, loamy soils

This association is in the northwestern part of the parish. It consists of loamy upland soils. Slopes are 8 to 20 percent. Elevation is 200 to 290 feet above sea level.

The association makes up about 8 percent of the parish. It is about 59 percent Smithdale soils and 41 percent Eustis, Ruston, Lucy, and Malbis soils.

Smithdale soils are mostly on side slopes. These soils are well drained and have moderate permeability. The surface layer is dark grayish-brown fine sandy loam. The subsoil is red sandy clay loam.

Most of this association is in pine trees. Most of the area is owned by timber companies and the Federal Government. The Kisatchie National Forest is the federally owned part.

The soils of this association are well suited to woodland. They are not suited to cultivation because of slope. Slope is the main limitation.

11. Vaiden-Watsonia association

Moderately sloping to moderately steep, clayey soils

This association is on ridgetops and side slopes on the uplands in the northwestern part of the parish. It consists of acid and alkaline, clayey soils. Slopes are 5 to 20 percent. Elevation is 180 to 250 feet above sea level.

The association makes up about 1 percent of the parish. It is about 25 percent Vaiden soils, 25 percent Watsonia soils, and 50 percent Cadeville, Anacoco, and Kisatchie soils.

Vaiden soils are on ridgetops and upper parts of side slopes. These soils are somewhat poorly drained and have very slow permeability. The surface layer is very dark grayish-brown silty clay. The subsoil is yellowish-brown clay mottled with grayish brown.

Watsonia soils are on side slopes. These soils are well drained and have very slow permeability. The surface layer is very dark gray silty clay. The subsoil is pale-olive and olive clay.

Most of this association is in pine trees. Most of the area is owned by timber companies and the Federal Government. The Kisatchie National Forest is the federally owned part.

The soils of this association are suited to hardwoods and pine. The more gently sloping soils are suited to pasture. Slope, very high shrink-swell potential, and low strength are the main limitations.

12. Kisatchie-Cadeville association

Moderately sloping to hilly, loamy soils that have a clayey subsoil

This association is on uplands in the northwestern part of the parish. It consists of acid, clayey soils. Slopes are 5 to 30 percent. Elevation is 190 to 280 feet above sea level.

The association makes up about 4 percent of the parish. It is about 45 percent Kisatchie soils, 38 percent Cadeville soils, and 17 percent Anacoco, Vaiden, and Watsonia soils.

Kisatchie soils are on the middle part of side slopes.

These soils are well drained and have very slow permeability. The surface layer is dark grayish-brown silt loam. The subsoil is pale-olive and olive-gray silty clay underlain by soft sandstone or siltstone.

Cadeville soils are on the middle and lower parts of side slopes. These soils are moderately well drained and have very slow permeability. The surface layer is very dark grayish-brown very fine sandy loam. The subsoil is yellowish-red clay mottled with brown and gray.

Most of this association is in pine trees. Timber companies own most of the area.

The soils of this association are well suited to woodland. The association is not suited to crops and is poorly suited to pasture. Slope, shrink-swell potential, and low strength are the main limitations. The underlying sandstone of the Kisatchie soils restricts penetration of roots.

Descriptions of the Soils

In this section the soils of Rapides Parish are described in detail, and their use and management are discussed. The detailed description of each soil series is followed by a brief description of the mapping units in that series. Unless otherwise mentioned, it is to be assumed that what is stated about the soil series holds true for the mapping units in that series. Thus, to get full information about any one mapping unit, it is necessary to read both the description of the mapping unit and the description of the soil series to which it belongs.

An important part of the description of each soil series is the soil profile, that is, the sequence of layers from the surface downward to rock or other underlying material. Each series contains two descriptions of this profile. The first is brief and in terms familiar to the layman. The second is much more detailed and is for those who need to make thorough and precise studies of soils. The profile described in the soil series is representative for mapping units in that series. If a given mapping unit has a profile in some ways different from the one described in the series, these differences are stated in the description of the mapping unit, or they are apparent in the name of the mapping unit. Color terms are for moist soil unless otherwise stated.

Preceding the name of each mapping unit is a symbol. This symbol identifies the mapping unit on the detailed soil map. Listed at the end of each description of a mapping unit is the capability unit and woodland suitability group in which the mapping unit has been placed.

The acreage and proportionate extent of each mapping unit are shown in table 1. Many of the terms used

TABLE 1.—*Approximate acreage and proportional extent of the soils*

Soil	Acres	Percent	Soil	Acres	Percent
Acadia silt loam, 0 to 1 percent slopes	21,044	2.4	McKamie very fine sandy loam, 5 to 12 percent slopes	1,947	0.2
Acadia silt loam, 1 to 3 percent slopes	12,459	1.4	Moreland silty clay loam, 0 to 1 percent slopes	3,439	.4
Alligator association, frequently flooded	5,912	.7	Moreland clay, 0 to 1 percent slopes	49,914	5.7
Anacoco silt loam, 1 to 4 percent slopes	6,957	.8	Moreland clay, gently undulating	6,888	.8
Aqualfs, 1 to 8 percent slopes	1,435	.2	Moreland clay, 0 to 1 percent slopes, occasionally flooded	36,599	4.2
Beauregard silt loam, 1 to 3 percent slopes	62,376	7.1	Moreland clay, 0 to 1 percent slopes, frequently flooded	12,532	1.4
Caddo silt loam	25,809	3.0	Morse clay, 1 to 5 percent slopes	471	.1
Cadeville very fine sandy loam, 1 to 5 percent slopes	8,030	.9	Mowata silt loam	441	.1
Cadeville very fine sandy loam, 5 to 20 percent slopes	7,710	.9	Norwood silt loam	63,575	7.3
Cahaba fine sandy loam, 1 to 3 percent slopes	9,298	1.1	Norwood silty clay loam	17,398	2.0
Crowley silt loam	1,159	.1	Paleudalfs	2,502	.3
Eustis loamy fine sand, 1 to 8 percent slopes	918	.1	Perry clay, frequently flooded	6,271	.7
Eustis loamy fine sand, 8 to 30 percent slopes	9,381	1.1	Rexor-Nugent complex, frequently flooded	12,084	1.4
Foley silt loam, occasionally flooded	9,351	1.1	Roxana very fine sandy loam, gently undulating	6,341	.7
Gallion silt loam	1,000	.1	Roxana very fine sandy loam, occasionally flooded	4,610	.5
Gallion silty clay loam	1,354	.2	Roxana soils, frequently flooded	1,131	.1
Glenmora silt loam, 1 to 3 percent slopes	10,546	1.2	Ruston fine sandy loam, 1 to 3 percent slopes	21,437	2.4
Gore very fine sandy loam, 1 to 5 percent slopes	35,653	4.1	Ruston fine sandy loam, 3 to 8 percent slopes	56,454	6.5
Gore very fine sandy loam, 5 to 12 percent slopes	35,844	4.1	Smithdale fine sandy loam, 8 to 12 percent slopes	23,769	2.7
Guyton complex	2,300	.3	Smithdale fine sandy loam, 12 to 20 percent slopes	19,242	2.2
Guyton complex, frequently flooded	75,649	8.7	Urbo silty clay loam, frequently flooded	2,165	.2
Kisatchie-Cadeville association, hilly	16,630	2.0	Vaiden-Watsonia association, rolling	4,758	.5
Kolin silt loam, 1 to 5 percent slopes	28,766	3.3	Wrightsville silt loam	12,130	1.4
Latanier silty clay loam	1,360	.2	Small water areas	5,019	.6
Latanier clay	21,295	2.4	Gravel pits	2,263	.3
Libuse silt loam, 1 to 5 percent slopes	11,728	1.3	Large water areas	13,378	1.5
Lucy loamy fine sand, 3 to 8 percent slopes	4,178	.5			
Malbis fine sandy loam, 1 to 5 percent slopes	55,670	6.4			
McKamie very fine sandy loam, 1 to 5 percent slopes	897	.1	Total	871,467	100.0

in describing soils can be found in the Glossary, and more detailed information about the terminology and methods of soil mapping can be obtained from the Soil Survey Manual (*9*).

Acadia Series

The Acadia series consists of nearly level to very gently sloping, somewhat poorly drained, very slowly permeable soils on broad flats and side slopes on uplands. These soils have a loamy surface layer and a clayey subsoil. They formed in clayey alluvial sediment.

In a representative profile the surface layer is dark grayish-brown silt loam about 3 inches thick. The subsurface layer is light brownish-gray silt loam about 3 inches thick. The subsoil is yellowish-brown silt loam to a depth of 16 inches. Below this, it is acid, light grayish-brown and gray clay and silty clay mottled with brown and red.

Most of the acreage of these soils is wooded or is in pasture. A small acreage is cultivated.

Representative profile of Acadia silt loam, 0 to 1 percent slopes, on a fire lane one-fourth mile northeast of gravel road, north corner of Spanish Land Grant, sec. 29, T. 4 N., R. 2 E.:

A1—0 to 3 inches, dark grayish-brown (10YR 4/2) silt loam; many, fine, distinct, dark-brown mottles; weak, medium, granular structure; friable; few, fine, dark-colored concretions; medium acid; clear, wavy boundary.

A2—3 to 6 inches, light brownish-gray (10YR 6/2) silt loam; many, fine, distinct, red mottles; weak, medium, subangular blocky structure; friable; many, fine, brown concretions; medium acid; abrupt, irregular boundary.

B1—6 to 16 inches, yellowish-brown (10YR 5/4) silt loam; common, fine, faint, dark-brown and brownish-yellow mottles; weak, coarse, subangular blocky structure; friable; many, fine pores; few, fine, soft, dark-colored bodies; interfingering A2 material; strongly acid; clear, irregular boundary.

B21t—16 to 26 inches, light brownish-gray (10YR 6/2) silty clay; many, coarse, faint, yellowish-brown (10YR 5/6) mottles and common, coarse, prominent, red (2.5YR 4/8) mottles; moderate, coarse, subangular blocky structure; firm; light-gray silt loam 2 to 5 millimeters thick between peds; thin, patchy clay films on vertical surfaces of peds; strongly acid; clear, wavy boundary.

B22t—26 to 33 inches, gray (10YR 5/1) clay; many, coarse, faint, yellowish-brown (10YR 5/6) and grayish-brown (10YR 5/2) mottles and common, coarse, prominent, red (2.5YR 4/6) mottles; moderate, medium, subangular blocky structure; firm; thin, patchy clay films on vertical surfaces of peds; strongly acid; clear, wavy boundary.

B3t—33 to 44 inches, gray (10YR 6/1) silty clay; common, medium, distinct, light olive-brown (2.5Y 5/6) mottles; moderate, medium, subangular blocky structure; firm; few, fine, dark-colored concretions; thin, patchy clay films on vertical surfaces of peds; dark-colored stains on peds; strongly acid; clear, wavy boundary.

C—44 to 72 inches, gray (10YR 5/1) silty clay; common, medium, faint, light olive-brown (2.5Y 5/6) mottles; massive; firm; few, fine, dark-colored concretions; dark-colored stains on peds; medium acid.

The A horizon ranges from 5 to 14 inches in thickness. It is very strongly acid to medium acid. The A1 horizon is dark brown, dark grayish-brown, or brown. The A2 horizon is gray, light brownish gray, or pale brown. The B1 horizon is more than 40 percent pale brown, brown, or yellowish brown and is mottled with shades of brown and yellow. It is silt loam or silty clay loam. The B2t horizon is gray, grayish brown, or light brownish gray mottled with shades of brown and red. It is silty clay or clay that is very strongly acid or strongly acid. The C horizon is gray silty clay or clay mottled with shades of red, yellow, or brown. It is very strongly acid to neutral.

Acadia soils are associated with Gore, Kolin, and Wrightsville soils. They are more poorly drained than Gore and Kolin soils. They are not so gray in the upper part of the solum as Wrightsville soils and are better drained than those soils.

AcA—Acadia silt loam, 0 to 1 percent slopes. This is a nearly level, somewhat poorly drained soil. It has a loamy surface layer and a clayey subsoil. This soil is on broad flats on uplands. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of Gore, Kolin, and Wrightsville soils and areas of soils that have a slightly acid or neutral subsoil.

This soil has low natural fertility. Runoff is slow after rains, and water moves very slowly through the subsoil. The soil is wet for long periods during winter and spring. A seasonal high water table is at a depth of 2 to 4 feet from December through April. Plants are likely to be damaged by a lack of moisture during dry periods in summer and in fall. Wetness, high shrink-swell potential of the clayey subsoil, and low strength are the main limitations.

Most of the acreage is in pine trees and pasture. A small acreage is in crops. Suitable crops are grain sorghum and soybeans. Suitable pasture plants are common bermudagrass, Pensacola bahiagrass, ryegrass, and southern wild winter pea. Wetness may delay planting. Surface crusting is common, and the soil is somewhat difficult to keep in good tilth. Proper crop residue management helps to improve tilth. Drainage is needed in depressions. Response of crops to fertilizer is good. Lime is generally needed. Capability unit IIIw–1; woodland suitability group 2w8.

AcB—Acadia silt loam, 1 to 3 percent slopes. This is a very gently sloping, somewhat poorly drained soil. It has a loamy surface layer and a clayey subsoil. This soil is on side slopes on uplands.

Included with this soil in mapping are small areas of Kolin, Libuse, and Gore soils. Also included are areas that have slopes of less than 1 percent.

This soil has low natural fertility. Runoff is medium after rains, and water moves very slowly through the subsoil. This soil is wet during winter and spring. It has a seasonal high water table at a depth of 2 to 4 feet from December through April. Plants are likely to be damaged by a lack of moisture during dry periods in summer and in fall. Wetness, high shrink-swell potential of the clayey subsoil, and low strength are the main limitations.

Most of the acreage is in pine trees and in pasture. A small acreage is in crops. Suitable crops are grain sorghum and soybeans. Suitable pasture plants are common bermudagrass, Pensacola bahiagrass, ryegrass, and southern wild winter pea. In places wetness delays planting. Surface crusting is common, and the soil is difficult to keep in good tilth. Proper crop residue management improves tilth. Contour cultivation or terraces help to reduce erosion when the soil is clean tilled. Response of crops to fertilizer is good. Lime is generally needed. Capability unit IIIe–1; woodland suitability group 2w8.

Alligator Series

The Alligator series consists of poorly drained, very slowly permeable, clayey soils on one large, broad, level area on the Mississippi River alluvial plain. These soils formed in clayey sediment on the nearly level Mississippi River alluvial plain.

In a representative profile the surface layer is dark-gray clay about 4 inches thick. The subsoil extends to a depth of 50 inches. It is gray clay mottled with yellowish brown.

Most of the acreage of these soils is wooded.

Representative profile of Alligator clay in an area of Alligator association, frequently flooded, approximately 1½ miles northwest of Hickory Grove community, 0.8 mile from escarpment along Columbia Gulf Transmission pipeline, 100 feet southeast of pipeline, southeast corner of NW¼NE¼ sec. 36, T. 6 N., R. 2 E.:

A1—0 to 4 inches, dark-gray (10YR 4/1) clay; moderate, medium, subangular blocky structure; sticky, plastic; strongly acid; abrupt, smooth boundary.

B21g—4 to 11 inches, gray (10YR 5/1) clay; few, fine, faint, yellowish-brown mottles; moderate, medium, subangular blocky structure; plastic; few slickensides; very strongly acid; gradual, wavy boundary.

B22g—11 to 21 inches, gray (10YR 6/1) clay; few, medium, faint, yellowish-brown mottles; moderate, medium, angular blocky structure; firm; very sticky, plastic; slickensides; very strongly acid; gradual, wavy boundary.

B23g—21 to 50 inches, gray (10YR 6/1) clay; few, fine, faint, yellowish-brown mottles; moderate, medium, angular blocky structure; very sticky, plastic; slickensides; very strongly acid; gradual, wavy boundary.

IICg—50 to 65 inches, gray (10YR 6/1) sandy clay loam; massive; sticky, very plastic; very strongly acid.

The A horizon is gray, dark gray, grayish brown, or dark grayish brown. The B2g horizon is gray mottled with brown and yellow. It is strongly acid or very strongly acid. The IICg horizon is silty clay, sandy clay loam, or clay. It is very strongly acid to slightly acid.

Alligator soils are associated with Foley soils. They are finer textured than Foley soils and lack the high concentration of sodium. Alligator soils are similar to Perry and Urbo soils. They are finer textured than Urbo soils and do not have the reddish color and moderately alkaline reaction in the lower part of the B horizon that is typical of Perry soils.

AL—Alligator association, frequently flooded. These soils are nearly level and poorly drained. They are in one large, broad area on the Mississippi River alluvial plain, adjacent to Catahoula Lake, Little River, Flagon Bayou, and Flagon Creek. They have slopes of 0 to 1 percent.

This mapping unit is about 65 percent Alligator clay and 25 percent soils on low ridges that are clayey to a depth of 30 to 40 inches and are loamy below. The remaining 10 percent is included soils. The composition of the mapping unit is more variable than that of most other units in the parish, but it has been controlled well enough so that interpretations can be made for the expected use of the soils. Included in mapping are small areas of Foley soils and areas on a few ridges of soils that have a loamy surface layer.

These soils have moderate natural fertility. They are subject to frequent flooding during winter and spring. Runoff is slow, and water moves very slowly through the soil. A seasonal high water table fluctuates between a depth of 2 feet and the surface from December through April. Cracks form during dry periods. The Alligator soils are sticky when wet and hard when dry. They are difficult to work. Flooding, very high shrink-swell potential, low strength, and wetness are the main limitations.

Most of the acreage is in hardwoods. A small acreage is used for pasture. These soils are not suited to crops or to most pasture plants, because of the hazard of flooding. Common bermudagrass and Pensacola bahiagrass are suitable pasture plants, but flooding severely restricts grazing time. These soils are suited to hardwoods. Capability unit Vw–1; woodland suitability group 3w6.

Anacoco Series

The Anacoco series consists of somewhat poorly drained, very slowly permeable soils on ridgetops and the upper part of side slopes on uplands. These soils have a loamy surface layer and a clayey subsoil. They formed in acid clayey marine sediment that is commonly underlain by siltstone or sandstone.

In a representative profile the surface layer is grayish-brown silt loam about 4 inches thick. The subsurface layer is gray silt loam about 7 inches thick. The subsoil extends to a depth of 46 inches. It is grayish-brown silty clay and clay mottled with shades of red and brown. The underlying material is pale-

olive silty clay loam stratified with very fine sandy loam and clay. It contains soft fragments of sandstone.

Most of the acreage of these soils is wooded.

Representative profile of Anacoco silt loam, 1 to 4 percent slopes, 5 miles northwest of Boyce, 2 miles northeast of Rock Quarry, 50 feet north of graded road, SE¼NE¼ sec. 1, T. 6 N., R. 4 W. (Laboratory sample number S70La–40–85):

A1—0 to 4 inches, grayish-brown (10YR 5/2) silt loam; weak, fine, granular structure; friable; medium acid; clear, smooth boundary.

A2—4 to 11 inches, gray (10YR 6/1) silt loam; few, fine, faint, dark yellowish-brown mottles; weak, coarse, subangular blocky structure; friable; very strongly acid; abrupt, wavy boundary.

B21t—11 to 17 inches, grayish-brown (2.5Y 5/2) silty clay; common, medium, prominent, yellowish-red (5YR 4/6) and strong-brown (7.5YR 5/6) mottles; moderate, medium, subangular blocky structure; firm; distinct, discontinuous clay films on peds; very strongly acid; gradual, smooth boundary.

B22t—17 to 23 inches, grayish-brown (2.5Y 5/2) clay; common, medium, faint, olive-brown (2.5Y 4/4) mottles; weak, very coarse, subangular blocky structure; firm; distinct, discontinuous clay films on peds; very strongly acid; gradual, smooth boundary.

B23t—23 to 46 inches, grayish-brown (2.5Y 5/2) clay; weak, very coarse, subangular blocky structure; very firm; few slickensides; few, thin, discontinuous clay films; very strongly acid; clear, smooth boundary.

C—46 to 96 inches, pale-olive (5Y 6/3) silty clay loam; massive; strata of very fine sandy loam and clay; common, soft sandstone fragments, ½ to 1 centimeter thick, 2 to 3 centimeters long, oriented horizontally; very strongly acid.

The A1 horizon is grayish brown, dark grayish brown, or dark gray. It is very strongly acid to medium acid. The A2 horizon is gray, light brownish gray, or light gray. It is strongly acid or very strongly acid. The Bt horizon is olive-gray, light brownish-gray, or grayish-brown silty clay or clay mottled with shades of brown, yellow, or red. It is strongly acid or very strongly acid. The C horizon is pale-olive, olive-gray, or light olive-brown silty clay loam stratified with layers of very fine sandy loam and clay. Soft siltstone and sandstone fragments are common at a depth of 40 inches or more. The C horizon is very strongly acid or strongly acid.

Anacoco soils are associated with Cadeville, Kisatchie, Vaiden, and Watsonia soils. They have a grayer B horizon than Cadeville soils. They have a thicker solum than Kisatchie soils. Anacoco soils are more acid and grayer than Watsonia or Vaiden soils.

AnB—Anacoco silt loam, 1 to 4 percent slopes. This is a very gently sloping to gently sloping, somewhat poorly drained soil. It has a loamy surface layer and a clayey subsoil. This soil is on uplands on long, narrow ridgetops and on the upper part of side slopes.

Included with this soil in mapping are small areas of Kisatchie, Cadeville, and Vaiden soils.

This soil has low natural fertility. Runoff is moderate to rapid, and water and air move very slowly through the soil. Water is perched above the clayey subsoil at a depth of 0 to 1 foot from December through April. Plants are damaged by a lack of moisture during dry periods in summer and in fall. The high shrink-swell potential of the clayey subsoil and low strength are the main limitations.

Most of the acreage is in pine trees. A small area is in pasture. This soil is poorly suited to crops, but crops such as grain sorghum and soybeans can be grown. The soil erodes readily if used for cultivated crops. Suitable pasture plants are common bermudagrass, Pensacola bahiagrass, and ryegrass. Response of crops to fertilizer is generally good. Lime is generally needed. Crop residue management and terraces or contour cultivation help to reduce erosion if the soil is used for crops. Capability unit IVe–1; woodland suitability group 4c2.

Aqualfs

Aqualfs consist of poorly drained, slowly permeable soils that have a sandy surface layer and a loamy and clayey subsoil. These soils are on uplands adjacent to drainageways. In many places water seeps to the surface most of the year. These soils formed in sandy and loamy alluvial sediment.

In a representative profile the surface layer is loamy sand about 26 inches thick. The upper part is very dark gray, and the lower part is light brownish gray. The subsurface layer is light-gray loamy sand about 6 inches thick. The subsoil extends to a depth of 64 inches. It is light-gray and light brownish-gray sandy clay loam and sandy clay mottled with brown and gray.

Most of the acreage of these soils is wooded.

Representative profile of Aqualfs, 1 to 8 percent slopes, ¼ mile west of T. L. James road, 100 yards south of fire lane, SE¼SW¼ sec. 14, T. 4 N., R. 5 W.:

A11—0 to 11 inches, very dark gray (10YR 3/1) loamy sand; weak, fine, granular structure; very friable; slightly acid; clear, smooth boundary.

A12—11 to 26 inches, light brownish-gray (10YR 6/2) loamy sand; many, medium, distinct, dark-brown (7.5YR 4/4) mottles; single grained; loose; very friable; slightly acid; gradual, smooth boundary.

A2—26 to 32 inches, light-gray (10YR 7/1) loamy sand; few, fine, faint, light yellowish-brown mottles; single grained; loose; tongues 2 to 4 inches in diameter of light-gray loamy fine sand extend 8 to 10 inches into B horizon; medium acid; abrupt, irregular boundary.

B21tg—32 to 46 inches, light-gray (10YR 7/2) sandy clay loam; many, medium, faint, yellowish-brown (10YR 5/6) mottles; weak, fine, subangular blocky structure; friable; few, thick, discontinuous clay

films on peds; very strongly acid; gradual, smooth boundary.

B22tg—46 to 64 inches, light brownish-gray (10YR 6/2) sandy clay; few, medium, faint, gray mottles; weak, coarse, subangular blocky structure; firm; few pockets of loamy sand; thin, discontinuous clay films on some peds; very strongly acid.

The A horizon ranges from 20 to 33 inches in thickness. It is slightly acid or medium acid. The A1 horizon is very dark gray, dark gray, or light brownish gray. The A2 horizon is gray or light gray, mottled with shades of brown and yellow. Tongues of A horizon material 2 to 4 inches in diameter extend 8 to 10 inches into the B horizon. The B horizon ranges from 48 to 66 inches in thickness. It is gray, light gray, or light brownish gray, and is mottled with shades of brown and yellow. It is slightly acid to very strongly acid. The B horizon is sandy clay loam or sandy clay and has pockets and streaks of sand.

Aqualfs are associated with Caddo, Eustis, and Beauregard soils. They are coarser textured than Caddo and Beauregard soils. They are more poorly drained than Eustis and Beauregard soils.

AsC—Aqualfs, 1 to 8 percent slopes. These are very gently sloping to moderately sloping, poorly drained soils. They have a sandy surface layer and a loamy and clayey subsoil. These soils are saturated with water most of the year. They are on uplands on footslopes adjacent to drainageways.

Included with these soils in mapping are small areas of Caddo, Malbis, and Guyton soils. Also included are small areas of materials that washed from higher elevations.

These soils have low natural fertility. Runoff is medium to rapid. In many places water seeps to the surface most of the year and air cannot be transmitted to the soil. Wetness and slope are the main limitations.

Most of the acreage is in pine trees. These soils are not suited to cultivation because of the long periods of wetness. They are poorly suited to pasture because of wetness, but common bermudagrass can be grown. Response of crops to fertilizer is fair to poor. Capability unit VIe–1; woodland suitability group 2w9.

Beauregard Series

The Beauregard series consists of moderately well drained, slowly permeable, loamy soils. They occur on the uplands. These soils formed in loamy alluvial sediment.

In a representative profile the surface layer is dark grayish-brown silt loam about 5 inches thick. The subsurface layer is yellowish-brown silt loam about 3 inches thick. The subsoil, to a depth of 75 inches, is yellowish-brown silty clay loam mottled with red, brown, and gray. Plinthite is between depths of 22 and 50 inches.

Most of the acreage of these soils is in pine woodland. A small acreage is in pasture and cropland.

Representative profile of Beauregard silt loam, 1 to 3 percent slopes, 5 miles north of Westport, SE¼SW¼ sec. 29, T. 1 S., R. 4 W.:

A1—0 to 5 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; friable; slightly acid; clear, smooth boundary.

A2—5 to 8 inches, light yellowish-brown (10YR 6/4) silt loam; massive; friable; medium acid; clear, smooth boundary.

B1—8 to 13 inches, yellowish-brown (10YR 5/6) silt loam; dark-gray A1 material in root channels; weak, fine, subangular blocky structure; friable; medium acid; clear, smooth boundary.

B21t—13 to 22 inches, yellowish-brown (10YR 5/4) silty clay loam; many, medium, faint, light yellowish-brown (10YR 6/4) and yellowish-red (5YR 4/6) mottles; moderate, medium, angular blocky structure; friable; thin, continuous clay films; few fine concretions of iron and manganese; few fine pores; very strongly acid; clear, wavy boundary.

B22t—22 to 35 inches, yellowish-brown (10YR 5/6) silty clay loam; many, coarse, distinct, brittle, red (2.5YR 4/6) and light-gray (10YR 7/2) mottles; moderate, medium, subangular blocky structure; firm; thin, continuous clay films; few, fine concretions of iron and manganese; about 7 percent nonindurated plinthite; very strongly acid; gradual, wavy boundary.

B23t—35 to 50 inches, yellowish-brown (10YR 5/8) and strong-brown (7.5YR 5/6) silty clay loam; vertical streaks of light-gray silt loam; moderate, medium to coarse, subangular blocky structure; firm; thin, discontinuous clay films; about 7 percent of mass is plinthite; very strongly acid; gradual, wavy boundary.

B24t—50 to 75 inches, yellowish-brown (10YR 5/6) silty clay loam; thin, vertical streaks of light-gray silt loam; weak, coarse, subangular blocky structure; firm; thin, patchy clay films; very strongly acid.

The A horizon ranges from 4 to 10 inches in thickness. It is slightly acid to very strongly acid. The A1 horizon is dark grayish brown, very dark grayish brown, or dark gray. The B1 horizon is yellowish-brown or light yellowish-brown silt loam or silty clay loam. The B2t horizon is yellowish brown or light yellowish brown mottled with gray and red. It is silty clay loam or silt loam and is medium acid to very strongly acid. The content of plinthite ranges from 3 to 10 percent.

Beauregard soils are associated with Caddo, Malbis, and Ruston soils. They are better drained and have a higher content of plinthite than Caddo soils. They are more poorly drained and are more mottled with gray than Malbis and Ruston soils. Beauregard soils have a lower base saturation and a higher content of plinthite than the otherwise similar Glenmora soils.

BeB—Beauregard silt loam, 1 to 3 percent slopes. This is a very gently sloping, moderately well drained, loamy soil on broad areas on uplands.

Included with this soil in mapping are small areas of Caddo and Malbis soils and small areas of soils that

have slopes of more than 3 percent. Also included are about 1,600 acres of soil that has a slightly higher content of sand and clay than Beauregard soils.

This soil has low natural fertility. Runoff is slow, and water moves slowly through the soil. The soil is wet for long periods. A seasonal high water table is at a depth of 1½ to 3 feet from December through April. Plants are likely to be damaged by a lack of moisture during dry periods in summer and in fall. Wetness is the main limitation.

Most of the acreage is in pine trees. A small acreage is in pasture and crops. Suitable crops are corn, grain sorghum, oats, and soybeans. Suitable pasture plants are common bermudagrass, Pensacola bahiagrass, southern wild winter pea, and ryegrass. The soil is easy to keep in good tilth. Wetness delays planting in places. Erosion is a hazard if the soil is clean tilled. Crop residue management and contour cultivation or terraces help to reduce erosion if the soil is cultivated. Response of crops to fertilizer is good. Lime is generally needed. Capability unit IIe–2; woodland suitability group 2w8.

Caddo Series

The Caddo series consists of poorly drained, slowly permeable, loamy soils on low, broad flats on uplands. These soils formed in loamy alluvial sediment.

In a representative profile the surface layer is dark grayish-brown silt loam about 4 inches thick. The subsurface layer is light-gray silt loam about 24 inches thick. The subsoil extends to a depth of 60 inches. It is light-gray silty clay loam mottled with brown and red.

Most of the acreage of these soils is wooded or is in pasture.

Representative profile of Caddo silt loam, in the Palustris Experiment Station, 50 feet north of gravel road, NE¼SW¼ sec. 35, T. 1 N., R. 3 W.:

A1—0 to 4 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; very friable; very strongly acid; smooth, irregular boundary.

A2g—4 to 28 inches, light-gray (10YR 7/1) silt loam; common, medium, faint, yellowish-brown (10YR 5/4) mottles; weak, coarse, subangular blocky structure; firm; few, fine concretions of iron and manganese; very strongly acid; abrupt, irregular boundary.

B21tg—28 to 36 inches, light-gray (10YR 7/1) silty clay loam; common, coarse, faint, yellowish-brown (10YR 5/4) mottles and common, coarse, prominent, red (2.5YR 4/8) mottles; moderate, coarse, subangular blocky structure; firm; thin, discontinuous clay films; common, fine, dark-brown and black concretions; tongues of A2 material 2 to 3 inches wide extend through the horizon; very strongly acid; gradual, wavy boundary.

B22tg—36 to 60 inches, light-gray (10YR 7/1) silty clay loam; common, coarse, distinct, light yellowish-brown (10YR 6/4) and yellowish-red (5YR 5/6) mottles; moderate, coarse, subangular blocky structure; thin, discontinuous clay films; firm; coatings of light-gray silt in cleavage planes; plinthite bodies make up about 3 percent of mass; very strongly acid; gradual, wavy boundary.

Cg—60 to 68 inches, light-gray (10YR 7/1) silty clay loam; common, medium, distinct, reddish-yellow (7.5YR 6/6) mottles; firm; very strongly acid.

The A horizon ranges from 14 to 30 inches in thickness. It is medium acid to very strongly acid. The Bt horizon is light brownish gray, brownish gray, gray, or light gray. It is strongly acid or very strongly acid. Tongues of A2 horizon material penetrate into the upper part of the Bt horizon.

Caddo soils are associated with Beauregard and Malbis soils. They are grayer and more poorly drained and have a lower content of plinthite than Beauregard and Malbis soils. Caddo soils contain plinthite, which Guyton soils lack.

Ca—Caddo silt loam. This soil is on uplands on low, broad flats between major drainageways. It is poorly drained. This soil has slopes of 0 to 1 percent.

Included with this soil in mapping are small areas of Beauregard, Guyton, and Wrightsville soils.

This soil has low natural fertility. Runoff is slow, and water moves slowly through the soil. The soil is wet for long periods during winter and spring. A seasonal high water table is at a depth of 0 to 2½ feet from December through April. Water stands in the depressions for short periods after rains. Plants are damaged by lack of moisture during dry periods in summer and fall. Wetness is the main limitation.

Most of the acreage is in pine trees. A small acreage is in pasture. Suitable crops are corn, grain sorghum, and soybeans. Suitable pasture plants are common bermudagrass, Pensacola bahiagrass, ryegrass, and southern wild winter peas. Surface crusting is common when the soil is clean tilled, and the soil is somewhat difficult to keep in good tilth. Proper crop residue management improves tilth. Wetness delays planting in places. Surface drainage is needed in places for crops and pasture. Response of most crops to fertilizer is generally good. Lime is generally needed. Capability unit IIIw–2; woodland suitability group 2w9.

Cadeville Series

The Cadeville series consists of moderately well-drained, very slowly permeable soils on uplands. These soils have a loamy surface layer and a clayey subsoil. They formed in clayey marine sediment.

In a representative profile the surface layer is very dark grayish-brown very fine sandy loam about 5 inches thick. The subsurface layer is grayish-brown very fine sandy loam about 7 inches thick. The subsoil extends to a depth of 43 inches. The upper part to a depth of 24 inches is yellowish-red clay mottled with red and brown. The lower part is light brownish-gray clay and silty clay mottled with brown and red.

Most of the acreage of these soils is wooded.

Representative profile of Cadeville very fine sandy loam, 1 to 5 percent slopes, 50 feet north of Campbell Cemetery Road, SE¼SE¼ sec. 20, T. 5 N., R. 4 W.:

A1—0 to 5 inches, very dark grayish-brown (10YR

3/2) very fine sandy loam; weak, fine, granular structure; friable; few, fine, dark-brown and black concretions; roots; strongly acid; clear, wavy boundary.

A2—5 to 12 inches, grayish-brown (10YR 5/2) and brown (10YR 5/3) very fine sandy loam; few, fine, faint, yellowish-brown mottles; weak, medium, granular structure; friable; strongly acid; abrupt, smooth boundary.

B1t—12 to 15 inches, brown (7.5YR 5/4) silty clay loam; common, fine, distinct, light brownish-gray (10YR 6/2) mottles; weak, medium, subangular blocky structure; firm; thin, patchy clay films; few, fine pores; strongly acid; clear, smooth boundary.

B2t—15 to 24 inches, yellowish-red (5YR 4/6) clay; common, fine, distinct, grayish-brown (10YR 5/2) and red (2.5YR 4/6) mottles; strong, medium, subangular blocky structure; firm; thin, patchy clay films; very strongly acid; gradual, wavy boundary.

B31t—24 to 39 inches, light brownish-gray (2.5Y 6/2) clay; many, coarse, prominent, red (2.5YR 4/6) mottles; moderate, medium, subangular blocky structure; firm; few slickensides; thin, patchy clay films; very strongly acid; clear, smooth boundary.

B32t—39 to 43 inches, light brownish-gray (2.5Y 6/2) silty clay; common, medium, distinct, brown (7.5YR 5/4) and red (2.5YR 5/8) mottles; moderate, medium, subangular blocky structure; firm; thin, patchy clay films; very strongly acid; abrupt, smooth boundary.

C1—43 to 56 inches, light brownish-gray (2.5Y 6/2) sandy clay loam; common, coarse, prominent, yellowish-red (5YR 5/8) mottles; massive; friable; very strongly acid; clear, smooth boundary.

IIC2—56 to 65 inches, light-gray (10YR 7/2) and light brownish-gray (10YR 6/2) very fine sandy loam; few, medium, distinct, brownish-yellow mottles; massive; friable; 4- to 5-inch strata of sandy clay loam, fine sandy loam, and sandy loam.

The A horizon ranges from 7 to 14 inches. It is medium acid or strongly acid. The A1 horizon is very dark grayish brown, dark grayish brown, or brown. The A2 horizon is grayish brown or brown. The Bt horizon is medium acid to extremely acid. The B2t horizon is yellowish-red, reddish-brown, or red silty clay or clay mottled with shades of brown, red, or gray. The B3t horizon is brownish-gray or light brownish-gray silty clay or clay. The C horizon is light brownish-gray or light-gray very fine sandy loam or sandy clay loam. It is extremely acid or very strongly acid.

Cadeville soils are associated with Anacoco, Kisatchie, Vaiden, and Watsonia soils. They have a redder B horizon than any of those soils. They do not have the underlying sandstone or siltstone of the Kisatchie soils.

CeC—Cadeville very fine sandy loam, 1 to 5 percent slopes. This is a very gently sloping to gently sloping, moderately well drained soil. It has a loamy surface layer and a clayey subsoil. This soil is on ridgetops on uplands. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of Anacoco, Kisatchie, Vaiden, and Ruston soils.

This soil has low natural fertility. Runoff is medium after rains, and water moves very slowly through the subsoil. A seasonal high water table is at a depth of 3 to 5 feet from December through April. Plants are generally damaged by a lack of moisture during dry periods in summer and in fall. The high shrink-swell potential of the clayey subsoil and low strength are the main limitations.

Most of the acreage is in pine trees. A small acreage is in pasture. This soil is poorly suited to crops, but crops such as soybeans and grain sorghum can be grown. Suitable pasture plants are common bermudagrass, Pensacola bahiagrass, crimson clover, tall fescue, weeping lovegrass, and ryegrass. Proper crop residue management and terraces help to reduce erosion when the soil is clean tilled. Response of crops to fertilizer is fair. Lime is generally needed. Capability unit IVe–1; woodland suitability group 3c2.

CeE—Cadeville very fine sandy loam, 5 to 20 percent slopes. This is a moderately sloping to moderately steep, moderately well drained soil. It has a loamy surface layer and a clayey subsoil. This soil is on side slopes on uplands. It has a profile similar to the one described as representative of the series, but the surface layer is about 4 inches thinner.

Included with this soil in mapping are small areas of Anacoco, Kisatchie, and Vaiden soils. In some places the loamy surface has been eroded away.

This soil has low natural fertility. Runoff is rapid after rains, and water moves very slowly through the subsoil. A seasonal high water table is at a depth of 3 to 5 feet from December through April. The high shrink-swell potential of the clayey subsoil, low strength, and slope are the main limitations.

Most of the acreage is in pine trees. This soil is not suited to crops because of steepness of slope. Suitable pasture plants are common bermudagrass and Pensacola bahiagrass. Response of pasture plants to fertilizer is fair. Lime is generally needed. Capability unit VIe–2; woodland suitability group 3c2.

Cahaba Series

The Cahaba series consists of well-drained, moderately permeable, loamy soils on low, narrow terraces along larger streams on uplands. These soils formed in loamy alluvial sediment.

In a representative profile the surface layer is dark grayish-brown fine sandy loam about 3 inches thick. The subsurface layer is dark yellowish-brown fine sandy loam about 9 inches thick. The subsoil is yellowish-red fine sandy loam to a depth of 22 inches. Below this, it is yellowish-red sandy clay loam to a depth of 41 inches.

Most of the acreage of these soils is wooded. A small acreage is in pasture or crops.

Representative profile of Cahaba fine sandy loam, 1 to 3 percent slopes, SW¼SW¼ sec. 18, T. 3 N., R. 4 W.:

A1—0 to 3 inches, dark grayish-brown (10YR

4/2) fine sandy loam; weak, fine, granular structure; friable; slightly acid; clear, wavy boundary.

A2—3 to 12 inches, dark yellowish-brown (10YR 4/4) fine sandy loam; weak, fine, granular structure; friable; medium acid; abrupt, wavy boundary.

B1—12 to 22 inches, yellowish-red (5YR 5/6) fine sandy loam; weak, medium, subangular blocky structure; friable; few, thin, discontinuous clay films; medium acid; clear, wavy boundary.

B2t—22 to 41 inches, yellowish-red (5YR 4/6) sandy clay loam; moderate, medium, subangular blocky structure; friable; clay bridging between sand grains; many, thin, discontinuous clay films; strongly acid; clear, wavy boundary.

B3t—41 to 53 inches, yellowish-red (5YR 5/6) fine sandy loam; few, medium, distinct, dark yellowish-brown mottles; weak, medium, subangular blocky structure; friable; few, thin, discontinuous clay films; very strongly acid; abrupt, smooth boundary.

C—53 to 74 inches, yellowish-red (5YR 5/8) loamy sand; single grained; loose; small pockets of sandy material; very strongly acid.

The A horizon ranges from 8 to 14 inches in thickness. It is slightly acid to strongly acid. The A1 horizon is very dark grayish brown, dark grayish brown, or grayish brown. The A2 horizon is dark yellowish brown or yellowish brown. The B2t horizon is yellowish-red or reddish-yellow sandy clay loam or clay loam. It is medium acid to very strongly acid. The C horizon is yellowish-brown or yellowish-red sandy loam or loamy sand. It is very strongly acid to medium acid.

Cahaba soils are associated with Guyton soils. They are better drained and coarser textured than Guyton soils. Cahaba soils have a thinner B horizon than the otherwise similar Ruston and Smithdale soils.

ChB—Cahaba fine sandy loam, 1 to 3 percent slopes. This is a very gently sloping, well-drained, loamy soil on uplands in small, narrow bands on low terraces adjacent to major streams.

Included with this soil in mapping are small areas of Gore, Guyton, and Ruston soils. Also included are small areas of soils that have slopes of more than 3 percent.

This soil has low natural fertility. Runoff is moderate. Movement of water through the subsoil is moderate after rains. A seasonal high water table is below a depth of 6 feet. Plants are likely to be damaged by a lack of moisture during dry periods in summer and in fall. There are no significant limitations.

Most of the acreage is in pine trees. A small acreage is in pasture and crops. Suitable crops are corn, oats, soybeans, grain sorghum, and truck crops. Suitable pasture plants are common bermudagrass, Pensacola bahiagrass, Coastal bermudagrass, ryegrass, and crimson clover. This soil is friable and can be worked over a wide range of moisture conditions. Proper crop residue management and contour cultivation help to reduce erosion if the soil is clean tilled. Response of crops to fertilizer is good. Lime is generally needed. Capability unit IIe–3; woodland suitability group 2o7.

Crowley Series

The Crowley series consists of somewhat poorly drained, nearly level, very slowly permeable soils in broad areas on uplands. They have a loamy surface layer and a clayey subsoil. These soils formed in clayey alluvial sediment.

In a representative profile the surface layer is silt loam about 11 inches thick. The upper 5 inches is gray, and the lower 6 inches is dark gray. The subsurface layer is gray silt loam about 9 inches thick. The subsoil extends to a depth of 49 inches. The upper 15 inches is dark-gray silty clay loam mottled with strong brown and red, and the lower 14 inches is gray and dark-gray silty clay mottled with red.

Most of the acreage of these soils is in crops and pasture.

Representative profile of Crowley silt loam, 250 feet west of gravel road, ⅓ mile south of Louisiana Highway 28, NW¼SE¼ sec. 29, T. 5 N., R. 2 E.:

Ap—0 to 5 inches, gray (10YR 5/1) silt loam; weak, medium, granular and weak, medium, subangular blocky structure; friable; brown coatings on some peds and in root channels; medium acid; clear, smooth boundary.

A12—5 to 11 inches, dark-gray (10YR 4/1) silt loam; few, fine, faint, dark-brown mottles; weak, coarse, subangular blocky structure; friable; many, fine pores; medium acid; clear, smooth boundary.

A2g—11 to 20 inches, gray (10YR 6/1) silt loam; common, medium, faint, dark yellowish-brown (10YR 4/4) mottles; weak, coarse, subangular blocky structure; friable; many, fine pores; few, fine concretions of iron and manganese; medium acid; abrupt, wavy boundary.

B21tg—20 to 35 inches, dark-gray (10YR 4/1) silty clay loam; common, medium, distinct, strong-brown (7.5YR 5/6) mottles and many, fine, prominent, red (2.5YR 4/8) mottles; moderate, coarse, prismatic structure parting to moderate, coarse, angular blocky; firm; continuous coatings of dark gray on peds; continuous, distinct clay films; about 5 percent interfingering A2 material 2 to 5 millimeters thick; medium acid; gradual, wavy boundary.

B22tg—35 to 49 inches, gray (10YR 5/1) and dark-gray (10YR 4/1) silty clay; many, medium, distinct, yellowish-red (5YR 5/6) mottles and few, fine, prominent, red (2.5YR 4/6) mottles; weak, coarse, prismatic structure parting to weak, coarse, angular blocky; firm; few, fine concretions of iron and manganese; thin, discontinuous clay films; few, thin, vertical streaks of dark-gray silt loam; medium acid; gradual, wavy boundary.

Cg—49 to 96 inches, gray (10YR 6/1) and light

olive-brown (2.5Y 5/6) silty clay; massive; firm; few, soft spots of calcium carbonate; common, fine, black concretions; moderately alkaline.

The A horizon ranges from 18 to 24 inches in thickness. It is very strongly acid to slightly acid. The A1 or Ap horizon is dark gray, gray, or grayish brown. The A2 horizon is dark gray, gray, or light brownish gray mottled with shades of brown. The B2tg horizon is dark-gray or gray silty clay loam or silty clay mottled with red, yellowish red, or brown. It is strongly acid to slightly acid.

Crowley soils are associated with Mowata soils and Paleudalfs. Crowley soils are more poorly drained than Paleudalfs and do not have tongues of A horizon material extending into the B horizon, which is typical of Mowata soils.

Cr—Crowley silt loam. This soil is in broad areas on uplands. It has a thick, loamy surface layer and a clayey subsoil. This soil is somewhat poorly drained. It has slopes of 0 to 1 percent.

Included with this soil in mapping are small areas of Gore, Mowata, Kolin, and Wrightsville soils. Also included are small areas of soils that have slopes of more than 1 percent and some low areas that are flooded for short periods after heavy rains.

This soil has moderately low natural fertility. Runoff is slow. Water moves very slowly through the subsoil. The soil is wet during winter and spring. It has a perched seasonal high water table above the clayey subsoil at a depth of 0 to 1½ feet from December through April. Plants are damaged by a lack of moisture during dry periods in summer and in fall. Wetness, high shrink-swell potential, and low strength are the main limitations.

Most of the acreage is in crops and pasture. Suitable crops are rice, grain sorghum, sweet potatoes, and soybeans. Suitable pasture plants are common bermudagrass, Pensacola bahiagrass, ryegrass, and southern wild winter peas. Surface crusting is common when the soil is clean tilled. Proper crop residue management improves tilth. Drainage is needed in places. Response of crops to fertilizer is generally good. Lime is generally needed. Capability unit IIIw–3; woodland suitability group 2w9.

Eustis Series

The Eustis series consists of somewhat excessively drained, moderately rapidly permeable, sandy soils on uplands. These soils formed in sandy marine sediment.

In a representative profile the surface layer is dark-brown loamy fine sand about 7 inches thick. The subsurface layer is yellowish-brown and strong-brown loamy fine sand about 19 inches thick. The subsoil to a depth of 75 inches is strong-brown and yellowish-red loamy fine sand.

Most of the acreage of these soils is wooded. A small acreage is in pasture.

Representative profile of Eustis loamy fine sand, 8 to 30 percent slopes, 0.4 mile west of Louisiana Highway 1200, 0.4 mile north on gravel road, 70 feet west of road, Spanish Land Grant, sec. 38, T. 4 N., R. 4 W.:

A1—0 to 7 inches, dark-brown (10YR 4/3) loamy fine sand; weak, fine, granular structure; very friable; strongly acid; clear, smooth boundary.

A21—7 to 13 inches, yellowish-brown (10YR 5/4) loamy fine sand; weak, medium, granular structure; very friable; few, loose, clean sand grains; strongly acid; clear, smooth boundary.

A22—13 to 26 inches, strong-brown (7.5YR 5/6) loamy fine sand; single grained; loose; common, fine pockets of pale-brown, clean sand grains; strongly acid; clear, wavy boundary.

B21t—26 to 44 inches, strong-brown (7.5YR 5/6) loamy fine sand; weak, coarse, granular structure; friable; clay bridging between some sand grains; few, small spots of clean sand grains; strongly acid; gradual, wavy boundary.

B22t—44 to 62 inches, yellowish-red (5YR 5/8) loamy fine sand; weak, medium, granular structure; very friable; clay bridging between some sand grains; sand grains stained with oxides; few spots of clean sand; very strongly acid; gradual, wavy boundary.

B23t—62 to 75 inches, yellowish-red (5YR 5/6) loamy fine sand; common, coarse, distinct, strong-brown (7.5YR 5/6) mottles; weak, medium, granular structure; very friable; some clay bridging; few, small spots of clean sand; few, small pebbles as much as 1 centimeter in diameter; very strongly acid.

The A horizon ranges from 18 to 30 inches in thickness. It is very strongly acid to strongly acid. The A1 horizon is dark brown or brown. The A2 horizon is yellowish brown, dark brown, or strong brown. The B2t horizon is reddish yellow, yellowish red, or strong brown. It is very strongly acid or strongly acid.

Eustis soils are associated with Lucy, Ruston, and Smithdale soils. They have a coarser textured B horizon than Lucy, Ruston, and Smithdale soils and a coarser textured A horizon than Ruston and Smithdale soils.

EuC—Eustis loamy fine sand, 1 to 8 percent slopes. This is a very gently sloping to moderately sloping, somewhat excessively drained, sandy soil on uplands.

Included with this soil in mapping are small areas of Lucy, Ruston, and Smithdale soils.

This soil has very low natural fertility. Runoff is slow. Water moves rapidly through the soil. A seasonal high water table is below a depth of 6 feet. Plants are severely damaged by a lack of moisture during summer and fall. Droughtiness and poor traction for equipment are the main limitations.

Most of the acreage is in pine trees. A small acreage is in pasture. This soil is poorly suited to most crop and pasture plants because of droughtiness, but such crops as grain sorghum and soybeans can be grown. Suitable pasture plants are Coastal bermudagrass, Pensacola bahiagrass, and weeping lovegrass. Adequate stands are difficult to establish because of the low available water capacity of the soil. Proper crop residue management and contour cultivation or stripcropping help to reduce erosion. Response of crops to fertilizer is poor.

Lime is generally needed. Capability unit IIIs–1; woodland suitability group 3s2.

EuE—Eustis loamy fine sand, 8 to 30 percent slopes. This is a strongly sloping to steep, somewhat excessively drained, sandy soil on side slopes on uplands. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of Lucy, Ruston, and Smithdale soils.

This soil has very low natural fertility. Water moves rapidly through the soil. A seasonal high water table is below a depth of 6 feet. Plants are severely damaged by a lack of moisture during summer and fall. Poor traction for equipment, slope, and droughtiness are the main limitations.

Most of the acreage is in pine trees. This soil is not suited to crops because of slope. It is poorly suited to pasture. Coastal bermudagrass, weeping lovegrass, and Pensacola bahiagrass can be grown, but adequate stands are difficult to establish because of low available water capacity of the soil. Response of crops to fertilizer is poor. Lime is generally needed. Capability unit VIe–3; woodland suitability group 3s2.

Foley Series

The Foley series consists of poorly drained, slowly permeable, nearly level, loamy soils at low elevations on uplands. They have a high saturation of sodium in the lower part of the subsoil. These soils formed in loamy alluvial sediment that has a low sand content.

In a representative profile the surface layer is dark-gray or gray silt loam about 2 inches thick. The subsurface layer is light brownish-gray and gray silt loam about 15 inches thick. The subsoil extends to a depth of 47 inches. It is gray silty clay loam mottled with shades of brown and gray.

Most of the acreage of these soils is wooded.

Representative profile of Foley silt loam, occasionally flooded, 3 miles southeast of Deville, 150 feet east of oil well, sec. 12, T. 4 N., R. 4 E.:

A1—0 to 2 inches, dark-gray (10YR 4/1) silt loam; moderate, fine, subangular blocky structure; firm; strongly acid; abrupt, smooth boundary.

A21g—2 to 9 inches, light brownish-gray (10YR 6/2) silt loam; few, fine, faint, yellowish-brown mottles; massive; friable; very few, fine, black specks; medium acid; clear, smooth boundary.

A22g—9 to 17 inches, gray (10YR 6/1) silt loam; common, medium, faint, yellowish-brown (10YR 5/6) mottles; massive; friable; common pores; streaks 1 to 2 millimeters wide of light-gray silt; few black specks; tongues 1 to 8 inches in diameter extend to a depth of 47 inches; few, thin, dark-gray clay bands and streaks; slightly acid; abrupt, irregular boundary.

A&B—17 to 25 inches, gray (10YR 6/1) silt loam; common, medium, distinct, dark-brown (7.5YR 4/4) mottles; massive; friable; 70 percent A2 material; B material is grayish-brown (10YR 5/2) silty clay loam; common, medium, distinct, dark-brown (7.5YR 4/4) mottles; moderate, medium, subangular blocky structure; firm; patchy, dark-gray clay films on peds and in pores; neutral; clear, irregular boundary.

B2tg—25 to 36 inches, gray (10YR 5/1) silty clay loam; many, medium, faint, yellowish-brown (10YR 5/6) mottles inside peds, few, fine, faint, yellowish-brown mottles on peds; weak, coarse, prismatic structure parting to moderate, subangular blocky; firm; few pores; distinct, discontinuous, dark-gray clay films on peds and in pores; few root channels lined with black stains; uncoated silt and very fine sand surround some peds and make up about 10 percent of horizon; mildly alkaline; clear, wavy boundary.

B3tg—36 to 47 inches, gray (10YR 6/1) silty clay loam; many, medium and coarse, faint, yellowish-brown (10YR 5/6) mottles inside peds; gray (10YR 6/1) surfaces on peds; few, fine, faint, pale-brown mottles; weak, medium and coarse, prismatic structure; firm; thin, patchy clay films; moderately alkaline; clear, wavy boundary.

C1g—47 to 56 inches, gray (10YR 5/1) silty clay loam; many, coarse, faint, yellowish-brown (10YR 5/6) mottles; massive; firm; moderately alkaline; gradual, wavy boundary.

C2—56 to 72 inches, pale-brown (10YR 6/3) silty clay loam; common, medium, faint, gray (10YR 5/1) mottles; massive; firm; concretions of carbonate as much as 1 inch in diameter; moderately alkaline.

The A horizon ranges from 14 to 19 inches in thickness. It is strongly acid to neutral. The A1 horizon is dark gray or dark grayish brown. The A2 horizon is light brownish gray or gray. The Bt horizon is light gray or gray mottled with shades of brown. It is neutral in the upper part and neutral to moderately alkaline in the lower part. The B3 and C horizons are gray or pale brown mottled with shades of brown and are mildly or moderately alkaline. Depth to layers that have 15 percent sodium saturation ranges from 18 to 32 inches.

Foley soils have 15 percent exchangeable sodium at less depth in the profile than is defined in the range for the Foley series. This difference does not alter their use, behavior, and management.

Foley soils are associated with Alligator soils. They are coarser textured than Alligator soils and have a higher concentration of sodium in the B horizon.

Fo—Foley silt loam, occasionally flooded. This soil is at low elevations on uplands. It is a poorly drained, loamy soil. This soil has about a 15 to 20 percent saturation of sodium in the subsoil. It has slopes of 0 to 1 percent.

Included with this soil in mapping are small areas of Alligator, Gore, and Kolin soils.

This soil has low natural fertility. Runoff is slow after rains. Water moves slowly through the subsoil. A seasonal high water table is at a depth of 0 to 2 feet from December through April. The soil is subject to flooding during winter and spring to a depth of about

4 feet. Plants are severely damaged by a lack of moisture in summer and in fall. The high saturation of sodium in the subsoil reduces the amount of water in the soil that is available to plants. Flooding, droughtiness in summer and in fall, and wetness in winter and in spring are the main limitations.

Most of the acreage is in low-quality hardwoods. The soil is poorly suited to crops and pasture, but crops such as grain sorghum and soybeans can be grown. Response of crops to fertilizer is poor to fair. Surface drainage is generally needed. Capability unit IVw–1; woodland suitability group 3w9.

Gallion Series

The Gallion series consists of well-drained, moderately permeable, loamy soils. These soils formed in loamy sediment on older natural levees of the Red River alluvial plain.

In a representative profile the surface layer is dark-brown silt loam about 14 inches thick. The subsoil extends to a depth of about 54 inches. It is reddish-brown silt loam mottled with red and brown.

Most of the acreage of these soils is in crops. A small acreage is in pasture.

Representative profile of Gallion silt loam, 2.5 miles south of Latanier on Louisiana Highway 456, 150 feet west, 200 feet south of northwest part of Spanish Land Grant, sec. 10, T. 2 N., R. 1 E. (Laboratory sample number S67La–40–2):

A1—0 to 5 inches, dark-brown (7.5YR 4/2) silt loam; weak, medium, subangular blocky structure; hard; medium acid; abrupt, smooth boundary.

A3—5 to 14 inches, dark-brown (7.5YR 4/4) silt loam; moderate, medium, subangular blocky structure; friable; few reddish-brown (5YR 4/3) spots; slightly acid; clear, smooth boundary.

B21t—14 to 29 inches, reddish-brown (5YR 4/4) silt loam; common, medium, faint, yellowish-red (5YR 4/6) mottles; moderate, coarse, subangular blocky structure; friable; common, fine pores; nearly discontinuous clay films; slightly acid; gradual, wavy boundary.

B22t—29 to 43 inches, reddish-brown (5YR 4/4) silt loam; moderate, medium, coarse, subangular blocky structure; friable; many, fine pores; reddish-brown (5YR 4/3) coatings on peds; continuous clay films on major peds; neutral; clear, smooth boundary.

B3t—43 to 54 inches, reddish-brown (5YR 4/4) silt loam; weak, coarse, subangular blocky structure; friable; reddish-brown (5YR 4/3) coatings on peds; few clay films; neutral; clear, smooth boundary.

C—54 to 70 inches, yellowish-red (5YR 4/6) very fine sandy loam; massive; very friable; few, thin, discontinuous strata (less than 1 inch thick) of clay loam; mildly alkaline.

The A horizon ranges from 10 to 15 inches in thickness. It is brown or dark-brown silt loam or silty clay loam and is medium acid to neutral. The B horizon is reddish-brown or yellowish-red silt loam or silty clay loam and is slightly acid to moderately alkaline. The C horizon is reddish-brown or yellowish-red stratified silt loam, silty clay loam, and very fine sandy loam. It is neutral to moderately alkaline. The C horizon contains calcium carbonate in places.

Gallion silty clay loam is outside the range of the Gallion series because it has a slightly darker A1 horizon. This difference does not alter its use, behavior, and management.

Gallion soils are associated with Latanier and Moreland soils. They have a coarser textured B horizon and are better drained than Latanier and Moreland soils.

Ga—Gallion silt loam. This is a well-drained, loamy soil on older natural levees on the Red River alluvial plain. It has slopes of 0 to 1 percent. This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of Latanier and Norwood soils. Also included are small areas of soils that have slopes of more than 1 percent, and some small areas of Gallion silty clay loam.

This soil has high natural fertility. Runoff is medium. Movement of water and air through the soil is moderate. Roots penetrate easily. A seasonal high water table is generally below a depth of 6 feet from December through April, but in places it is at a depth of 4 to 6 feet. Adequate water is available to plants in most years except during extremely dry periods. Low strength is a limitation for some nonfarm uses.

Most of the acreage is in crops. A small acreage is in pasture. Suitable crops are corn, grain sorghum, oats, cotton, sugarcane, truck crops, sweet potatoes, and soybeans. Suitable pasture plants are common bermudagrass, Coastal bermudagrass, tall fescue, Pensacola bahiagrass, ryegrass, and white clover. The soil is friable and is easy to keep in good tilth. Traffic pans develop easily but can be broken by chiseling or deep plowing. A surface drainage system is needed for optimum production of cultivated crops. Land smoothing and leveling help to improve surface drainage and to increase the efficiency of farm equipment. Response of crops to fertilizer is good. Lime is generally needed. Capability unit I–2; woodland suitability group 2o4.

Gn—Gallion silty clay loam. This is a well-drained, loamy soil on older natural levees on the Red River alluvial plain. It has slopes of 0 to 1 percent. This soil has a profile similar to the one described as representative of the series, but it has a dark-brown silty clay loam surface layer about 10 inches thick.

Included with this soil in mapping are small areas of Gallion silt loam and Latanier and Moreland soils.

This soil has high natural fertility. Runoff is slow. Roots penetrate fairly easily. Movement of water and air through the subsoil is moderate. A seasonal high water table is generally below a depth of 6 feet from December through March, but in places it is at a depth of 4 to 6 feet. In places runoff from higher elevations collects in depressions for short periods after rains. Low strength is a limitation for some uses.

Most of this acreage is in crops and pasture. Suitable crops are corn, sugarcane, cotton, oats, grain sorghum, and soybeans. Suitable pasture plants are common bermudagrass, Coastal bermudagrass, Pensacola bahiagrass, tall fescue, ryegrass, and white clover. The soil

is somewhat difficult to keep in good tilth because of the silty clay loam surface layer, but it may be improved by proper crop residue management. Wetness in the surface layer restricts the use of farm equipment. Drainage is generally needed to remove excess surface water if this soil is used for crops and pasture. Land smoothing and leveling help to improve surface drainage and to increase the efficiency of farm equipment. Response of crops to fertilizer is good. Lime is generally needed. Capability unit IIw–1; woodland suitability group 2o4.

Glenmora Series

The Glenmora series consists of moderately well drained, slowly permeable, loamy soils on uplands.

In a representative profile the surface layer is very dark gray silt loam about 4 inches thick. The subsurface layer is brown silt loam about 4 inches thick. The subsoil is yellowish-brown silt loam to a depth of 32 inches. Below this to a depth of 62 inches it is yellowish-brown silty clay loam mottled with shades of red.

Most of the acreage of these soils is wooded or is in pasture.

Representative profile of Glenmora silt loam, 1 to 3 percent slopes, 5 miles southeast of Glenmora, ¼ mile west of fire lane, SE¼SE¼ sec. 29, T. 1 S., R. 2 W.:

A1–0 to 4 inches, very dark-gray (10YR 3/1) silt loam; weak, fine, granular structure; very friable; medium acid; clear, smooth boundary.

A2—4 to 8 inches, brown (10YR 5/3) silt loam; weak, medium, granular structure; very friable; worm holes, pores, and root channels filled with A1 material; medium acid; clear, wavy boundary.

B1—8 to 15 inches, yellowish-brown (10YR 5/6) silt loam; weak, medium, subangular blocky structure; friable; pores and root channels lined with clay; few, fine, brown and black concretions; very strongly acid; clear, wavy boundary.

B21t—15 to 25 inches, yellowish-brown (10YR 5/6) silt loam; moderate, medium, subangular blocky structure; friable; few, thin, patchy clay films; pores and some root channels lined with clay; few, fine, brown and black concretions; few, discrete plinthite bodies; very strongly acid; clear, irregular boundary.

A&B—25 to 32 inches, 60 percent light brownish-gray (10YR 6/2) silt loam A horizon material; 40 percent yellowish-brown (10YR 5/4) silt loam B horizon material; moderate, medium, subangular blocky structure; friable; very strongly acid; clear, irregular boundary.

B22t—32 to 47 inches, yellowish-brown (10YR 5/6) silty clay loam; common, medium, distinct, yellowish-red (5YR 4/6) mottles; moderate, coarse, subangular blocky structure; firm; common, thin, continuous clay films; interfingering gray, sandy A&B material 2 to 10 millimeters thick extends about 6 inches into horizon; very strongly acid; clear, irregular boundary.

B23t—47 to 62 inches, yellowish-brown (10YR 5/6, 5/8) silty clay loam; common, medium, faint, light brownish-gray (10YR 6/2) mottles; moderate, coarse, subangular blocky structure; firm; few, coarse pockets of grayish sand; common, thin, continuous clay films; few spots of red material; very strongly acid.

The A horizon ranges from 6 to 10 inches in thickness. The A horizon is very dark gray or dark grayish brown and is medium acid to very strongly acid. The A2 horizon is brown or pale-brown very fine sandy loam or silt loam. The A horizon part of the A&B horizon is light brownish-gray or pale-brown very fine sandy loam or silt loam. The upper part of the Bt horizon is yellowish brown or strong brown mottled with shades of gray, brown, and red. The entire Bt horizon is strongly acid or very strongly acid.

Glenmora soils are associated with Guyton and Gore soils. They are better drained and less gray than Guyton soils and are less clayey in the B horizon than Gore soils. Glenmora soils have a higher base saturation and contain less plinthite than the otherwise similar Beauregard soils.

GoB—Glenmora silt loam, 1 to 3 percent slopes. This is a very gently sloping, moderately well drained, loamy soil on broad stream divides on uplands.

Included with this soil in mapping are small areas of Caddo and Gore soils and some areas of soils that have a moundy surface.

This soil has somewhat low natural fertility. Runoff is medium. Water and air move slowly through the lower part of the subsoil. Roots penetrate easily in the upper part of the subsoil, but the lower part of the subsoil restricts root development. In places plants are damaged by a lack of moisture during dry periods in summer and in fall. A seasonal high water table is at a depth of 2 to 3 feet from December through April. The soil is wet during winter and spring. Wetness and low strength are the main limitations.

Most of the acreage is wooded and in pasture. Suitable crops are corn, oats, soybeans, grain sorghum, and sweet potatoes. Suitable pasture plants are common bermudagrass, Coastal bermudagrass, Pensacola bahiagrass, ryegrass, and southern wild winter pea. This soil is friable and is fairly easy to keep in good tilth, but surface crusting is common when the soil is clean tilled. Proper crop residue management improves tilth and reduces crusting. Terraces or contour cultivation help to reduce erosion. Capability unit IIe–2; woodland suitability group 2w8.

Gore Series

The Gore series consists of moderately well drained, very slowly permeable soils in areas parallel to and adjacent to streams on uplands. These soils have a loamy surface layer and a clayey subsoil. They formed in clayey alluvial sediment.

In a representative profile the surface layer is dark grayish-brown fine sandy loam about 2 inches thick. The subsurface layer is brown very fine sandy loam

about 4 inches thick. The subsoil extends to a depth of 58 inches. The upper 18 inches is red silty clay and yellowish-red clay mottled with gray and brown, and the lower 34 inches is mainly light brownish-gray and gray clay and silty clay mottled with red.

Most of the acreage of these soils is wooded. A small acreage is in pasture.

Representative profile of Gore very fine sandy loam, 1 to 5 percent slopes, 1.1 miles west of Otis, 38 yards north of gravel road, sec. 26, T. 3 N., R. 4 W.:

A1—0 to 2 inches, dark grayish-brown (10YR 4/2) very fine sandy loam; weak, fine and medium, subangular blocky structure; friable; medium acid; clear, wavy boundary.

A2—2 to 6 inches, brown (10YR 5/3) very fine sandy loam; few, medium, faint, grayish-brown (10YR 5/2) mottles; weak, coarse, platy structure; friable; common pores; medium acid; clear, wavy boundary.

B21t—6 to 16 inches, red (2.5YR 4/6) silty clay; few, fine, distinct, pale-brown mottles; moderate, fine and medium, subangular blocky structure; firm; thin, discontinuous clay films; strongly acid; gradual, wavy boundary.

B22t—16 to 24 inches, yellowish-red (5YR 5/6) clay; few, fine, prominent, light brownish-gray mottles; moderate, fine and medium, subangular blocky structure; firm; thin, patchy clay films on peds and in pores; very strongly acid; gradual wavy boundary.

B23t—24 to 30 inches, light brownish-gray (10YR 6/2) clay; many, medium, prominent, dark-red (2.5YR 3/6) mottles; moderate, fine and medium, subangular blocky structure; firm; thin, patchy clay films; very strongly acid; gradual, wavy boundary.

B31—30 to 48 inches, gray (10YR 6/1) silty clay; many, medium, prominent, red (2.5YR 4/6) and strong-brown (7.5YR 5/6) mottles; massive; firm; few pockets of very fine sandy loam and silty clay loam in lower part of horizon; very strongly acid; abrupt, wavy boundary.

B32—48 to 58 inches, yellowish-red (5YR 5/6) clay; moderate, fine, subangular blocky structure; firm; few slickensides that do not intersect; medium acid.

C—58 to 73 inches, reddish-brown (2.5YR 4/4) clay; few, medium, prominent, grayish-brown (2.5Y 5/2) mottles; massive; firm; medium acid.

The A horizon is slightly acid to strongly acid. The A1 horizon is dark grayish brown, grayish brown, or light grayish brown. The A2 horizon is brown or light grayish brown. The B horizon is strongly acid or very strongly acid in the upper part and ranges to neutral in the lower part. It is clay or silty clay. The upper part is red or yellowish red mottled with shades of brown. The lower part is dominantly gray or light brownish gray mottled with shades of red. The C horizon is medium acid to mildly alkaline.

Gore soils are associated with Glenmora, Acadia, Kolin, Libuse, McKamie, and Wrightsville soils. They are more clayey in the B horizon than Glenmora soils. Gore soils are better drained than Acadia and Wrightsville soils. They are finer textured in the upper part of the B horizon than Kolin and Libuse soils. Gore soils are more poorly drained than McKamie soils.

GrC—Gore very fine sandy loam, 1 to 5 percent slopes. This is a very gently sloping to gently sloping, moderately well drained soil adjacent to drainageways on uplands. It has a loamy surface layer and a clayey subsoil. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of Acadia, Kolin, McKamie, and Morse soils.

This soil has low natural fertility. Runoff is medium after rains, and water moves very slowly through the subsoil. A seasonal high water table is at a depth greater than 6 feet. Plants are likely to be damaged by a lack of soil moisture during dry periods in summer and in fall. The very high shrink-swell potential of the subsoil and the underlying material and low strength are the main limitations.

Most of the acreage is wooded. A small acreage is in pasture. This soil is poorly suited to crops, but soybeans and grain sorghum can be grown. Suitable pasture plants are common bermudagrass, Pensacola bahiagrass, crimson clover, tall fescue, weeping lovegrass, and ryegrass. Proper crop residue management and terraces help to reduce erosion when the soil is cultivated. Response of crops to fertilizer is poor. Lime is generally needed. Capability unit IVe–1; woodland suitability group 3c2.

GrD—Gore very fine sandy loam, 5 to 12 percent slopes. This is a moderately sloping to strongly sloping, moderately well drained soil on side slopes along drainageways on uplands. It has a loamy surface layer and a clayey subsoil.

Included with this soil in mapping are small areas of McKamie and Morse soils and small areas of soils that have slopes of 1 to 5 percent. In places the loamy surface layer has been eroded and the clayey subsoil is exposed.

This soil has low natural fertility. Runoff is rapid after rains and water moves very slowly through the subsoil. A seasonal high water table is below a depth of 6 feet. The very high shrink-swell potential of the subsoil and underlying material, low strength, and slope are the main limitations.

Most of the acreage is wooded. This soil is not suited to crops because of slope. Suitable pasture plants are common bermudagrass and Pensacola bahiagrass. Capability unit VIe–2; woodland suitability group 3c2.

Guyton Series

The Guyton series consists of poorly drained, slowly permeable, loamy soils. These soils are on flats and in depressions on low terraces on uplands and on alluvial plains of streams that drain uplands. They formed in loamy alluvial sediment.

In a representative profile the surface layer is grayish-brown silt loam about 3 inches thick. The subsurface layer is light brownish-gray silt loam about 14 inches thick. The subsoil to a depth of 80 inches is

grayish-brown silty clay loam mottled with yellowish brown.

Most of the acreage of these soils is wooded.

Representative profile of Guyton silt loam in an area of Guyton complex, frequently flooded, 115 feet west of Louisiana Highway 112, sec. 27, T. 2 N., R. 4 W.:

A1—0 to 3 inches, grayish-brown (10YR 5/2) silt loam; weak, medium and fine, granular structure; friable; very strongly acid; clear, smooth boundary.

A21—3 to 12 inches, light brownish-gray (10YR 6/2) silt loam; few, fine, faint, dark yellowish-brown and yellowish-brown mottles; massive; friable; few pores; few, fine, black accretions; approximately 20 percent very fine sand; strongly acid; gradual, wavy boundary.

A22—12 to 17 inches, light brownish-gray (10YR 6/2) silt loam; few, medium, faint, yellowish-brown (10YR 5/6) mottles; massive; friable; pockets and streaks of light-gray silt; few random bands of dark-gray clay less than 1 millimeter thick; few, fine, brown and black accretions; tongues up to 3 inches wide extend to a depth of 36 inches in the underlying horizons; very strongly acid; abrupt, irregular boundary.

B&A—17 to 28 inches, grayish-brown (10YR 5/2) silty clay loam; common, medium, faint, yellowish-brown (10YR 5/6) mottles; moderate, medium, subangular blocky structure; firm; common, discontinuous, very dark gray clay films on peds and in pores; gray and light-gray silt tongues; coatings of silt 1 to 2 millimeters thick; very strongly acid (pH 5.0); abrupt, irregular boundary.

B2t—28 to 38 inches, grayish-brown (10YR 5/2) silty clay loam; many, medium, faint, brown (10YR 5/3) and yellowish-brown (10YR 5/6) mottles; weak, coarse, prismatic structure parting to moderate, medium, subangular blocky; firm; roots concentrated along prism faces; distinct, discontinuous clay films on peds; few, dark-gray clay flows; thin, patchy, light-gray (10YR 7/1) coatings of silt on peds; strongly acid (pH 5.0); gradual, wavy boundary.

B31t—38 to 69 inches, grayish-brown (10YR 5/2) silty clay loam; common, medium, faint, yellowish-brown (10YR 5/6) mottles; weak, coarse, subangular blocky structure; hard; few, thin, patchy, light-gray coatings of silt on peds; thin, patchy clay films; very strongly acid (pH 5.0); diffuse, wavy boundary.

B32—69 to 80 inches, grayish-brown (10YR 5/2) loam; common, medium, faint, yellowish-brown mottles; weak, coarse, subangular blocky structure; hard; medium acid (pH 6.0).

The A horizon ranges from 16 to 22 inches in thickness. It is very strongly acid or strongly acid. The A1 horizon is brown, grayish brown, or light brownish gray. The A2 horizon is gray or light brownish gray mottled with shades of brown. The Bt horizon is grayish brown, gray, or light brownish gray and is mottled with strong brown or yellowish brown. It is strongly acid or very strongly acid.

Guyton soils have more exchangeable sodium than is defined in the range for the Guyton series. This difference does not alter their use, behavior, and management.

Guyton soils are associated with Cahaba, Glenmora, Urbo, Rexor, and Nugent soils. They are grayer and more poorly drained than any of these soils except Urbo soils. They are not so fine textured as Urbo soils. Guyton soils do not contain plinthite, which is typical of Caddo soils. They have a less clayey B horizon than Wrightsville soils.

Gu—Guyton complex. This complex is at low elevations on flats and in depressions on uplands. It consists of poorly drained loamy soils. It has slopes of 0 to 1 percent. These soils have a profile similar to the one described as representative of the series, but their surface layer is about 4 inches thicker.

This complex is 65 percent Guyton soils and about 25 percent soils that are slightly better drained. The remaining 10 percent is included soils. These soils are so closely intermingled that they are mapped as one unit.

Included with this complex in mapping are small areas of Cahaba, Wrightsville, and Acadia soils. Also included are small areas of soils that are subject to occasional flooding.

The Guyton soils have low natural fertility. Runoff is slow, and water moves slowly through the soil. A seasonal high water table is at a depth of 0 to 1½ feet from December through April. The soils are dry during summer and fall. Wetness and low strength are the main limitations.

Most of the acreage is wooded. Suitable crops are grain sorghum, rice, and soybeans. Suitable pasture plants are common bermudagrass, Pensacola bahiagrass, and southern wild winter peas. Surface drainage may be needed for crops and pasture. Surface crusting is common if the soils are clean tilled. The soils are somewhat difficult to keep in good tilth. Proper crop residue management improves tilth. Response of most crops to fertilizer is fairly good. Lime is generally needed. Capability unit IIIw–2; woodland suitability group 2w9.

Gy—Guyton complex, frequently flooded. This complex is on alluvial plains of streams that drain the uplands. It consists of poorly drained, loamy soils. Slopes are 0 to 1 percent. It has the profile described as representative of the series.

This complex is 60 percent Guyton soils and about 20 percent soils that are better drained. The remaining 20 percent is included soils. These soils are so closely intermingled that they are mapped as one unit.

Included with this complex in mapping are small areas of Cahaba, Nugent, and Rexor soils.

This complex has low natural fertility. Runoff is slow, and water moves slowly through the soil. A seasonal high water table is at a depth of 0 to 1½ feet from December through April. This complex is frequently flooded because of runoff received following rains dur-

ing winter and spring. It is dry during summer and fall. Flooding, low strength, and wetness are the main limitations.

Most of the acreage is in mixed hardwoods and pine trees. This complex is not suited to crops or to most pasture plants, because of flooding. Suitable pasture plants are Pensacola bahiagrass and common bermudagrass. However, flooding restricts grazing time. Capability unit Vw–4; woodland suitability group 2w9.

Kisatchie Series

The Kisatchie series consists of well-drained, very slowly permeable soils on uplands. These soils have a loamy surface layer and a clayey subsoil underlain by soft sandstone or siltstone. They formed in clayey marine sediment over siltstone or sandstone.

In a representative profile the surface layer is dark grayish-brown silt loam about 6 inches thick. The subsoil is olive-gray and pale-olive silty clay about 18 inches thick. Siltstone is at a depth of 24 inches.

Most of the acreage of these soils is wooded.

Representative profile of Kisatchie silt loam, in an area of Kisatchie-Cadeville association, hilly, about 2 miles northeast of Sharp, NE¼SW¼ sec. 11, T. 5 N., R. 4 W.:

A11—0 to 3 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine, granular structure; friable; very strongly acid; clear, wavy boundary.

A12—3 to 6 inches, dark grayish-brown (10YR 4/2) silt loam; weak, medium, subangular blocky structure; friable; very strongly acid; clear, wavy boundary.

B21t—6 to 10 inches, olive-gray (5YR 5/2) silty clay; moderate, medium, subangular blocky structure; firm; thin, patchy clay films on peds; very strongly acid; clear, wavy boundary.

B22t—10 to 17 inches, pale-olive (5Y 6/3) silty clay; moderate, coarse, subangular blocky structure; firm; thin, patchy clay films on peds; very strongly acid; clear, wavy boundary.

B3t—17 to 24 inches, pale-olive (5Y 6/3, 6/4) channery clay loam; moderate, coarse, subangular blocky structure; firm; dark grayish-brown clay films on peds; dark grayish-brown clay bodies 2 to 3 centimeters in diameter throughout horizon; 20 percent olive siltstone fragments ½ to 1 centimeter thick and 2 to 3 centimeters long, oriented horizontally; very strongly acid; clear, smooth boundary.

IIR—24 to 50 inches, olive (5Y 5/4) siltstone; weakly cemented plates 1 to 3 centimeters thick; dark grayish-brown clay flows in vertical cracks and thin, dark grayish-brown clay coatings along horizontal planes; few, fine roots in upper part; about 10 percent is pockets of friable fine sand; very strongly acid.

The A horizon ranges from 3 to 6 inches in thickness. It is strongly acid or very strongly acid. It is very dark gray, very dark grayish brown, or dark grayish brown. The Bt horizon is light olive-gray, olive-gray, or pale olive gray silty clay or silty clay loam in the upper part and ranges to clay loam in the lower part. It is mottled with shades of brown. It is very strongly acid or extremely acid. Soft sandstone fragments are in the lower part of the Bt horizon. The IIR horizon is sandstone or siltstone.

Kisatchie soils are associated with Anacoco, Cadeville, Watsonia, and Vaiden soils. They have a thinner solum and have rock at a shallower depth than Anacoco soils. Kisatchie soils do not have a red B horizon, which is typical of Cadeville soils, and have a thinner solum. They are more acid than Watsonia soils. They are not so fine textured as Vaiden soils and are better drained.

KCE—Kisatchie-Cadeville association, hilly. This association consists of moderately sloping to steep, well drained and moderately well drained soils on uplands. It has a loamy surface layer and a clayey subsoil. It has slopes of 5 to 30 percent.

The composition of this association is more variable than that of most other units in the parish, but has been controlled well enough that interpretations can be made for expected use of the soils.

This association is made up of about 40 percent Kisatchie soils and 35 percent Cadeville soils. The remaining 25 percent is mostly Lucy, Vaiden, and Watsonia soils. Scattered areas of rock outcrop are common throughout this association (fig. 2).

The Kisatchie soils are on the middle part of slopes. They have low natural fertility. Runoff is rapid, and water moves very slowly through the soil. A seasonal high water table is below a depth of 6 feet. Sandstone or siltstone at a depth of about 24 inches restricts root development. Depth to rock, slope, the high shrink-swell potential of the subsoil, and low strength are the main limitations.

The Cadeville soils are on the middle and lower parts

Figure 2.—**Rock outcrop on Kisatchie part of Kisatchie-Cadeville association, hilly.**

of slopes. The profile of these soils is similar to the one described as representative of the Cadeville series, but the surface layer is about 4 inches thinner. They have low natural fertility. Water moves very slowly through the soil after rains. A seasonal high water table is at a depth of 3 to 5 feet from December through April. The high shrink-swell potential of the subsoil, low strength, and slope are the main limitations.

Most of the acreage is wooded. The soils of this association are not suited to cultivated crops and are poorly suited to pasture because of slope. Suitable pasture plants are common bermudagrass and Pensacola bahiagrass. Capability unit VIe–2; woodland suitability group—Kisatchie soils 5d3, Cadeville soils 3c2.

Kolin Series

The Kolin series consists of moderately well drained, very slowly permeable soils on stream terraces on uplands. These soils are loamy in the upper part of the subsoil and clayey in the lower part.

In a representative profile the surface layer is dark grayish-brown silt loam about 5 inches thick. The subsurface layer is pale-brown silt loam about 3 inches thick. The subsoil is strong-brown silty clay loam to a depth of 24 inches. Below this to a depth of 80 inches it is strong-brown silty clay and red and yellowish-red clay mottled with gray.

Most of the acreage of these soils is wooded or is in pasture. A small acreage is in crops.

Representative profile of Kolin silt loam, 1 to 5 percent slopes, 0.7 mile north of Kolin Church, 66 feet west of ditch embankment, sec. 30, T. 4 N., R. 2 E.:

A1—0 to 5 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; friable; slightly acid; clear, wavy boundary.

A2—5 to 8 inches, pale-brown (10YR 6/3) silt loam; weak, medium, subangular blocky structure; friable; medium acid; clear, smooth boundary.

B21t—8 to 14 inches, strong-brown (7.5YR 5/6) silty clay loam; few, fine, faint, pink mottles; moderate, medium, subangular blocky structure; firm; thin, patchy clay films on peds; some pores lined with clay; strongly acid; clear, wavy boundary.

B22t—14 to 19 inches, strong-brown (7.5YR 5/6) silty clay loam; common, fine, distinct, yellowish-red and pink mottles; moderate, medium, subangular blocky structure; firm; few, fine pores; thin, patchy clay films on peds; gray silt coatings as much as 1 millimeter thick on peds in lower part; strongly acid; abrupt, irregular boundary.

B23t—19 to 24 inches, strong-brown (7.5YR 5/6) silty clay loam; many, coarse, faint, light-brown (7.5YR 6/4) mottles and few, fine, prominent, red mottles; strong, moderate, coarse, subangular blocky structure; firm; few, fine pores; light-gray silt coatings 2 to 10 millimeters thick surrounding peds make up about 15 percent of horizon; thin, patchy clay films on peds; strongly acid; clear, irregular boundary.

IIB24t—24 to 37 inches, strong-brown (7.5YR 5/6) silty clay; many, coarse, prominent, red (2.5YR 5/6) mottles and common, coarse, distinct, light-gray (10YR 7/2) mottles; strong, medium, subangular blocky structure; very firm; thin, continuous clay films on vertical and horizontal faces of peds; very strongly acid; gradual, wavy boundary.

IIB25t—37 to 66 inches, red (2.5YR 5/6) clay; common, medium, prominent, light-gray (10YR 7/2) mottles; moderate, medium, subangular blocky structure; firm; light yellowish-brown silt coatings as much as 1 millimeter thick on some peds; thin, patchy clay films on peds; slightly acid; gradual, wavy boundary.

IIB3t—66 to 80 inches, yellowish-red (5YR 5/6) clay; many, coarse, distinct, pinkish-gray (5YR 7/2) mottles; moderate, coarse, subangular blocky structure; very firm; thin, patchy clay films on peds; slightly acid.

The A horizon is strongly acid to slightly acid. The A1 or Ap horizon is dark grayish brown, dark gray, or dark brown. The A2 horizon is pale brown or dark grayish brown. The B horizon ranges from 15 to 30 inches in thickness. It is yellowish brown, strong brown, or yellowish red and is strongly acid or medium acid. The lower part of the B horizon, above the contact between the B horizon and the IIB horizon, is 5 to 15 percent grayish silt coatings 2 to 10 millimeters thick. The IIB horizon is strong-brown, yellowish-red, or red silty clay or clay mottled with shades of gray. It is very strongly acid to slightly acid.

Kolin soils are associated with Acadia, Gore, Libuse, and Wrightsville soils. They are better drained and coarser textured than Acadia and Wrightsville soils. They are not so fine textured in the upper part of the B horizon as Gore soils. They do not have a fragipan, which is typical of Libuse soils.

KnB—Kolin silt loam, 1 to 5 percent slopes. This is a very gently sloping to gently sloping, moderately well-drained soil on stream terraces. It is loamy in the upper part of the subsoil and clayey in the lower part.

Included with this soil in mapping are small areas of Acadia, Libuse, and Gore soils.

This soil has somewhat low natural fertility. Runoff is slow to medium. Water and air move very slowly through the soil. The clayey lower part of the subsoil restricts movement of water. Water perches above the clayey lower part of the subsoil at a depth of 1 to 2 feet from December through April. Wetness, the hazard of erosion, the high shrink-swell potential of the clayey lower part of the subsoil, and low strength are the main limitations.

Most of the acreage is wooded and in pasture. A small acreage is in crops. Suitable crops are corn, oats, grain sorghum, soybeans, sweet potatoes, and truck crops. Suitable pasture plants are common bermudagrass, Coastal bermudagrass, Pensacola bahiagrass, ryegrass, and crimson clover. This soil is friable and

is fairly easy to keep in good tilth, but the surface may crust when the soil is clean tilled. Proper management of crop residue and green-manure crops improves tilth and reduces crusting. Contour cultivation or terraces help to reduce erosion. Response of crops to fertilizer is fairly good. Lime is generally needed. Capability unit IIIe–2; woodland suitability group 3w8.

Latanier Series

The Latanier series consists of somewhat poorly drained, very slowly permeable soils. These soils have a clayey subsoil and loamy underlying material. They formed in clayey alluvial sediment underlain by loamy alluvial sediment on the Red River alluvial plain.

In a representative profile the surface layer is dark reddish-brown clay about 6 inches thick. The subsoil is dark reddish-brown clay and silty clay to a depth of 30 inches. The underlying material is stratified light reddish-brown and reddish-brown silty clay loam and silt loam.

Most of the acreage of these soils is in pasture or crops. A small acreage is wooded.

Representative profile of Latanier clay, 1.1 miles east and 0.4 mile south of Chambers, 100 feet east of drainage ditch, 400 feet north of southeast corner of Spanish Land Grant, sec. 54, T. 2 N., R. 1 E.:

Ap—0 to 6 inches, dark reddish-brown (5YR 3/3) clay; strong, coarse, subangular blocky structure; very firm; neutral; gradual, wavy boundary.

B21—6 to 25 inches, dark reddish-brown (5YR 3/3) clay; moderate, coarse, prismatic structure parting to moderate, medium and fine, angular blocky; firm; mildly alkaline; strongly effervescent; abrupt, wavy boundary.

B22—25 to 30 inches, dark reddish-brown (5YR 3/4) silty clay; weak, coarse, subangular blocky structure; firm; moderately alkaline; strongly effervescent; clear, wavy boundary.

IIC1—30 to 41 inches, light reddish-brown (5YR 6/4) silt loam; massive; friable; moderately alkaline; strongly effervescent; abrupt, wavy boundary.

IIC2—41 to 45 inches, reddish-brown (5YR 5/4) silty clay loam; massive; plastic; moderately alkaline; strongly effervescent; abrupt, wavy boundary.

IIC3—45 to 60 inches, reddish-brown (5YR 4/4) silt loam; massive; very friable; moderately alkaline; strongly effervescent.

The A horizon is dark-brown to dark reddish-brown clay, silty clay, or silty clay loam. It is neutral to mildly alkaline. The B horizon is dark reddish-brown, reddish-brown, or light reddish-brown clay or silty clay. It is neutral to moderately alkaline. It is calcareous in places. Depth to the IIC horizon ranges from 20 to 34 inches. It is dark reddish-brown, reddish-brown, or light reddish-brown stratified silty clay loam and silt loam. The C horizon is neutral to moderately alkaline. It is calcareous below a depth of 30 inches.

Latanier soils are associated with Moreland, Gallion, and Norwood soils. Latanier soils are not so fine textured in the lower part of the profile as Moreland soils. They are finer textured than Norwood and Gallion soils and have more alkaline A and B horizons than Gallion soils.

La—Latanier silty clay loam. This soil is in fairly broad, flat areas adjacent to the backswamp on the Red River alluvial plain. It has a loamy surface layer and a clayey subsoil underlain by stratified loamy material. This soil is somewhat poorly drained. It has slopes of 0 to 1 percent. This soil has a profile similar to the one described as representative of the series, but it has a silty clay loam surface layer.

Included with this soil in mapping are small areas of Moreland and Norwood soils.

This soil has high natural fertility. Runoff is slow, and water and air move very slowly through the soil. The soil is wet for long periods during winter and spring. A seasonal high water table is at a depth of 1½ to 3 feet from December through April. Plants are likely to be damaged by a lack of moisture during dry periods. This soil cracks when it is dry, and the cracks seal over when it is wet. Wetness and the very high shrink-swell potential of the clayey subsoil are the main limitations.

Most of the acreage is in crops and pasture. Suitable crops are corn, cotton, sugarcane, grain sorghum, rice, and soybeans. Suitable pasture plants are common bermudagrass, tall fescue, Pensacola bahiagrass, and white clover. The soil is somewhat difficult to keep in good tilth because of the silty clay loam surface layer. A surface drainage system is needed for cultivated crops and pasture. Response of most crops to nitrogen fertilizer is good. Capability unit IIIw–4; woodland suitability group 2w5.

Lc—Latanier clay. This soil is between natural levees and backswamp areas on the Red River alluvial plain. It has a clayey surface layer and a clayey subsoil underlain by stratified loamy material. This soil is somewhat poorly drained. It has slopes of 0 to 1 percent. This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of Moreland and Norwood soils and Latanier silty clay loam.

This soil has high natural fertility. Runoff is slow, and water and air move very slowly through the soil. The soil is wet for long periods during winter and spring. A seasonal high water table is at a depth of 1½ to 3 feet from December through April. Plants are likely to be damaged by a lack of moisture during dry periods. This soil develops cracks when dry and seals over when wet. Wetness, low strength, and the high and very high shrink-swell potential of the surface layer and subsoil are the main limitations.

Most of the acreage is in pasture and crops. The remaining acreage is wooded (fig. 3).

Suitable crops are cotton, sugarcane, grain sorghum, rice, oats, and soybeans. Suitable pasture plants are common bermudagrass, Coastal bermudagrass, ryegrass, tall fescue, Pensacola bahiagrass, and white clover. The soil is difficult to keep in good tilth because of the clay surface layer. Proper crop residue management improves tilth. The soil can be worked only over a

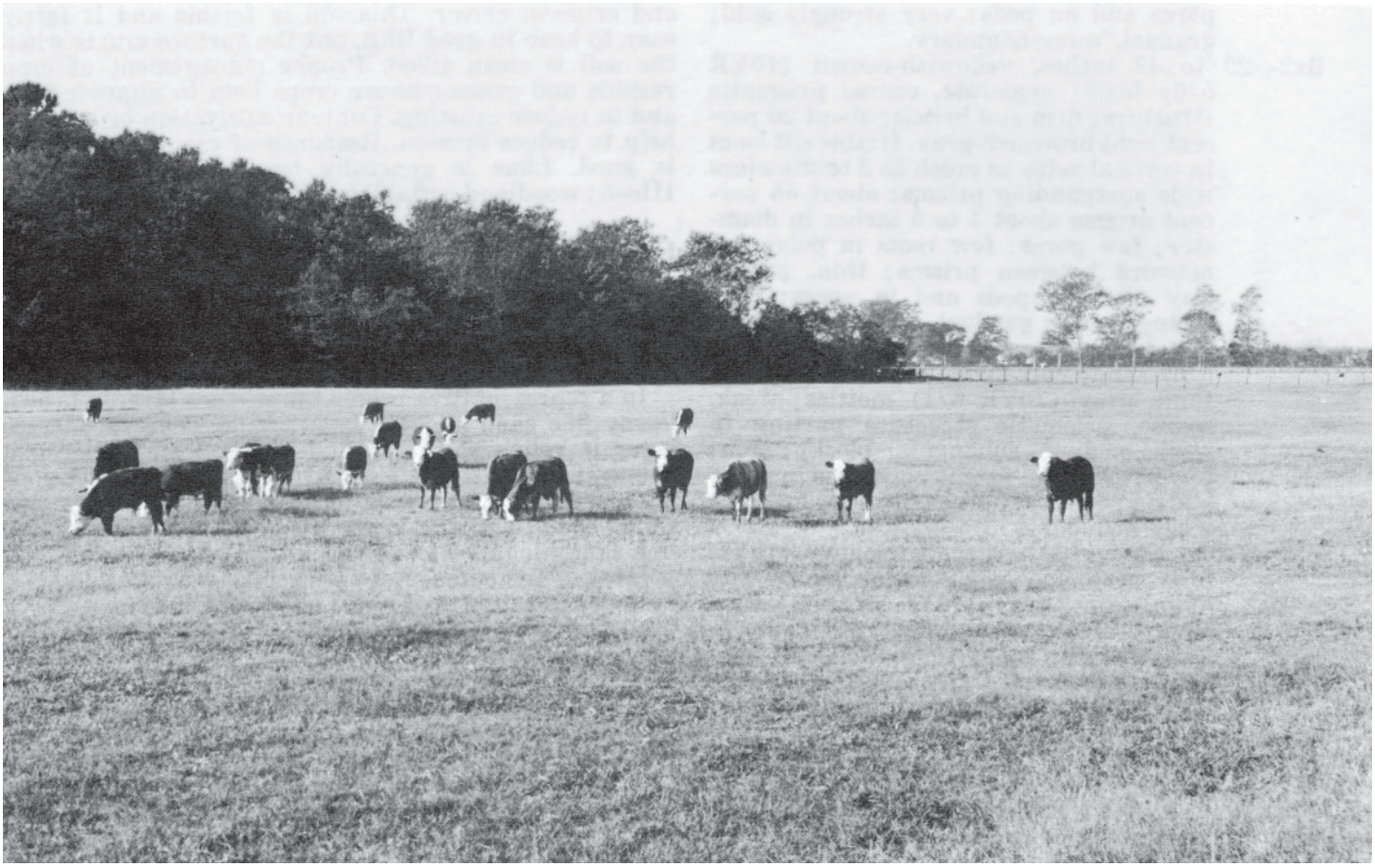


Figure 3.—**Common bermudagrass pasture on an area of Latanier clay.**

narrow range of moisture content. A surface drainage system is needed for crops and pasture. Response of most crops to nitrogen fertilizer is good. Capability unit IIIw–5; woodland suitability group 2w5.

Libuse Series

The Libuse series consists of moderately well drained, slowly permeable, loamy soils on uplands. These soils have a fragipan. They formed in loamy sediment that has a low content of sand underlain by loamy sediment that has a high content of sand.

In a representative profile the surface layer is very dark gray silt loam about 5 inches thick. The subsoil to a depth of 9 inches is yellowish-brown silt loam. The next 11 inches is yellowish-brown silty clay loam. Below this is a fragipan that extends to a depth of 42 inches. It is yellowish-brown loam that has veins of grayish, brownish, and reddish material.

Most of the acreage of these soils is wooded or is in pasture.

Representative profile of Libuse silt loam, 1 to 5 percent slopes, 2.5 miles southeast of Libuse, SW¼SW¼ sec. 6, T. 4 N., R. 2 E. (Laboratory sample number S70La–40–87):

A1—0 to 5 inches, very dark gray (10YR 3/1) silt loam; weak, fine, granular structure; friable; slightly acid; clear, wavy boundary.

B1—5 to 9 inches, yellowish-brown (10YR 5/4) silt loam; weak, medium, subangular blocky structure; friable; medium acid; clear, wavy boundary.

B2t—9 to 20 inches, yellowish-brown (10YR 5/6) silty clay loam; common, medium, prominent, red (2.5YR 4/6) mottles; moderate, medium, subangular blocky structure; friable; common, fine pores; distinct, discontinuous clay films in pores and on peds; strongly acid; clear, wavy boundary.

Bx1—20 to 29 inches, yellowish-brown (10YR 5/6) loam; moderate, coarse, prismatic structure; firm and brittle; common, fine pores; few, fine roots between prisms; between prisms is 15 percent light grayish-brown silt loam in vertical veins about 2 centimeters wide; light brownish-gray material bounded by a thin, discontinuous band of firm and brittle, red material; few, thin, horizontal bands of light grayish-brown silt loam penetrate prisms; prisms 4 to 6 inches in diameter make up about 60 percent of the horizontal

cross section; thin, patchy clay films in pores and on peds; very strongly acid; gradual, wavy boundary.

Bx2—29 to 42 inches, yellowish-brown (10YR 5/6) loam; moderate, coarse prismatic structure; firm and brittle; about 20 percent light brownish-gray, friable silt loam in vertical veins as much as 2 centimeters wide surrounding prisms; about 65 percent prisms about 4 to 5 inches in diameter; few pores; few roots in polygonal network between prisms; thin, patchy clay films on peds and in pores; very strongly acid; gradual, wavy boundary.

B31t—42 to 54 inches, yellowish-brown (10YR 5/6) sandy clay loam; common, medium, faint, gray (10YR 6/1) mottles; weak, coarse, prismatic structure parting to weak, medium, subangular blocky; firm; few pores; thin, patchy clay films in pores and on peds; very strongly acid; gradual, wavy boundary.

B32—54 to 60+ inches, brownish-yellow (10YR 6/6) very fine sandy loam; many, medium, faint, gray (10YR 6/1) mottles; weak, coarse, subangular blocky structure; friable; about 10 percent very fine sand skeletans in vertical streaks; medium acid; gradual, wavy boundary.

The A horizon ranges from 3 to 8 inches in thickness. It is very dark gray, dark grayish brown, or grayish brown. It is strongly acid to medium acid. The B horizon is yellowish brown, light yellowish brown, or dark yellowish brown. The Bt horizon is very strongly acid to medium acid. The fragipan ranges from 11 to 25 inches in thickness. It is very strongly acid to strongly acid. It is yellowish-brown, dark yellowish-brown, or brown silt loam, loam, or silty clay loam. Cracks between peds are filled with grayish silt loam or silty clay loam. The B horizon below the fragipan is yellowish-brown or light yellowish-brown sandy clay loam or very fine sandy loam.

Libuse soils are associated with Acadia, Gore, and Kolin soils. They differ from those soils in having a fragipan and a coarser textured B horizon. They are better drained than Acadia soils.

LsB—Libuse silt loam, 1 to 5 percent slopes. This is a very gently sloping to gently sloping, moderately well drained, loamy soil that has a fragipan. It is on uplands.

Included with this soil in mapping are small areas of Acadia and Kolin soils and some small areas of soils that do not have a fragipan.

This soil has moderately low natural fertility. Runoff is medium. Water and air move moderately fast through the upper part of the soil, but the fragipan restricts the movement of air and water in the lower part. The soil has a perched water table above the fragipan at a depth of 1 to 2 feet for short periods after heavy rains from December through April. The hazard of erosion and wetness are the main limitations.

Most of the acreage is wooded and in pasture. A small acreage is in crops. Suitable crops are corn, grain sorghum, oats, soybeans, sweet potatoes, and truck crops. Suitable pasture plants are common bermudagrass, Pensacola bahiagrass, Coastal bermudagrass, ryegrass, and crimson clover. This soil is friable and is fairly easy to keep in good tilth, but the surface crusts when the soil is clean tilled. Proper management of crop residue and green-manure crops help to improve tilth and to reduce crusting. Contour cultivation or terraces help to reduce erosion. Response of crops to fertilizer is good. Lime is generally needed. Capability unit IIIe–3; woodland suitability group 2o1.

Lucy Series

The Lucy series consists of well-drained, moderately permeable soils on uplands. These soils have a sandy surface layer and loamy subsoil. They formed in loamy marine or alluvial sediment.

In a representative profile the surface layer is brown loamy fine sand about 9 inches thick. The subsurface layer is yellowish-brown and yellow loamy fine sand about 21 inches thick. The subsoil extends to a depth of 65 inches. The upper 8 inches is strong-brown fine sandy loam, and the lower 27 inches is yellowish-red fine sandy loam.

Most of the acreage of these soils is wooded.

Representative profile of Lucy loamy fine sand, 3 to 8 percent slopes, 20 feet northeast of gravel road, 0.7 mile east of United States Highway 165, 10 miles south of Alexandria, NE¼NW¼ sec. 5, T. 2 N., R. 1 W.:

A11—0 to 3 inches, dark grayish-brown (10YR 4/2) loamy fine sand; single grained; very friable; strongly acid; abrupt, smooth boundary.

A12—3 to 9 inches, dark-brown (10YR 4/3) loamy fine sand; single grained; very friable; very strongly acid; clear, smooth boundary.

A21—9 to 18 inches, yellowish-brown (10YR 5/4) loamy fine sand; single grained; very friable; very strongly acid; clear, wavy boundary.

A22—18 to 30 inches, yellow (10YR 7/6) loamy fine sand; single grained; very friable; very strongly acid; clear, wavy boundary.

B1t—30 to 38 inches, strong-brown (7.5YR 5/6) fine sandy loam; common, medium, distinct, yellowish-red (5YR 4/8) mottles; weak, medium, subangular blocky structure; friable; thin, patchy clay films in root channels; very strongly acid; gradual, smooth boundary.

B2t—38 to 54 inches, yellowish-red (5YR 4/8) fine sandy loam; moderate, medium, subangular blocky structure; friable; thick, continuous clay films; very strongly acid; diffuse, wavy boundary.

B3—54 to 65 inches, yellowish-red (5YR 5/6) fine sandy loam; moderate, medium, subangular blocky structure; friable; thin, patchy clay films; small pockets of loose, pink sand; very strongly acid.

The A horizon is strongly acid or very strongly acid. The A1 horizon ranges from 3 to 12 inches in thickness. It is dark grayish brown, brown, or dark brown. The A2 horizon is yellowish brown or yellow and ranges from 12 to 30 inches in thickness. The B

horizon is strongly acid or very strongly acid. The B2t horizon is yellowish-red or red fine sandy loam or sandy clay loam.

In this parish Lucy soils lack the reddish color in the upper part of the B horizon that is defined in the range for the Lucy series. This difference does not alter the use, behavior, and management of these soils.

Lucy soils are associated with Ruston, Eustis, and Smithdale soils. They have a thicker and coarser textured A horizon than Ruston and Smithdale soils. They have a finer textured B horizon than Eustis soils.

LuC—Lucy loamy fine sand, 3 to 8 percent slopes. This is a gently sloping to moderately sloping, well-drained soil on ridgetops and the upper part of side slopes on uplands. It has a sandy surface layer and a loamy subsoil.

Included with this soil in mapping are small areas of Ruston and Eustis soils.

This soil has low natural fertility. Runoff is slow. Water and air move rapidly through the surface and subsurface layers and moderately through the subsoil. Roots penetrate easily. A seasonal high water table is below a depth of 6 feet. Plants are likely to be damaged by a lack of moisture during dry periods. Poor traction and droughtiness are the main limitations.

Most of the acreage is wooded. A small acreage is in pasture. Suitable crops are oats, grain sorghum, soybeans, and truck crops. Suitable pasture plants are Coastal bermudagrass, Pensacola bahiagrass, ryegrass, and weeping lovegrass. This soil is friable and is easy to keep in good tilth. Contour cultivation or terraces are needed to help control erosion. Crop residue management and green manure crops help to hold the soil and to improve fertility. Response of crops to fertilizer is good. Lime is needed for most crops. Capability unit IIIs–2; woodland suitability group 3s2.

Malbis Series

The Malbis series consists of moderately well drained, moderately slowly permeable, loamy soils on uplands. These soils contain plinthite in the subsoil. They formed in loamy marine or alluvial sediment.

In a representative profile the surface layer is dark grayish-brown fine sandy loam about 5 inches thick. The subsurface layer is light yellowish-brown fine sandy loam about 3 inches thick. The subsoil is sandy clay loam to a depth of 77 inches. The upper 36 inches is yellowish-brown, and the lower 33 inches is yellowish-red. Plinthite is at a depth below 19 inches.

Most of the acreage of these soils is wooded. A small acreage is in pasture.

Representative profile of Malbis fine sandy loam, 1 to 5 percent slopes, 30 feet west of gravel road, 0.2 mile south of United States Forest Service Road 278, NE¼NE¼ sec. 5, T. 2 N., R. 3 W.:

A1—0 to 5 inches, dark grayish-brown (10YR 4/2) fine sandy loam; weak, fine, granular structure; very friable; strongly acid; clear, wavy boundary.

A2—5 to 8 inches, light yellowish-brown (10YR 6/4) fine sandy loam; weak, fine to medium, subangular blocky structure; very friable; strongly acid; clear, wavy boundary.

B21t—8 to 19 inches, yellowish-brown (10YR 5/6, 5/8) sandy clay loam; moderate, medium, subangular blocky structure; friable; thin, continuous clay films on peds and in pores; very strongly acid; clear, smooth boundary.

B22t—19 to 26 inches, yellowish-brown (10YR 5/6) sandy clay loam; moderate, medium, subangular blocky structure; friable; thin, continuous clay films on peds and in pores; few red plinthite bodies make up less than 2 percent of the horizon; very strongly acid; clear, smooth boundary.

B23t—26 to 34 inches, yellowish-brown (10YR 5/6) sandy clay loam; common, fine and medium, distinct, yellowish-red (5YR 4/8) mottles; moderate, medium, subangular blocky structure; friable, thin, discontinuous clay films; few, fine, brown concretions of iron oxide; few red plinthite bodies make up less than 2 percent of the horizon; very strongly acid; diffuse, wavy boundary.

B24t—34 to 44 inches, yellowish-brown (10YR 5/8) and red (2.5YR 4/8) sandy clay loam; common, coarse, prominent, light-gray mottles; weak, coarse, subangular blocky structure; friable; few patchy clay films; dark stains in gray mottles along root channels; 10 percent nonindurated plinthite; very strongly acid; diffuse, wavy boundary.

B3—44 to 77 inches, yellowish-red (5YR 5/6) sandy clay loam; few, medium, prominent, light-gray mottles; weak, medium, subangular blocky structure; friable; 6 percent nonindurated plinthite; very strongly acid; clear, smooth boundary.

C—77 to 96 inches, mottled strong-brown (7.5YR 5/6, 5/8) and light-brown (7.5YR 6/4) sandy loam; single grained; very friable; very strongly acid.

The A horizon is medium acid or strongly acid. The A1 horizon is dark grayish brown or grayish brown. The A2 horizon is pale brown or light yellowish brown. The B2t horizon is strong brown or yellowish brown. It is very strongly acid or strongly acid.

Malbis soils are associated with Caddo, Beauregard, and Ruston soils. They are better drained than Caddo and Beauregard soils and are more poorly drained than Ruston soils.

MaC—Malbis fine sandy loam, 1 to 5 percent slopes. This is a very gently sloping to gently sloping, moderately well drained, loamy soil on uplands.

Included with this soil in mapping are small areas of Ruston, Beauregard, and Lucy soils.

This soil has low natural fertility. Runoff is medium, and water and air move moderately slowly through the soil. A seasonal high water table is at a depth greater than 6 feet. Roots penetrate easily. The part of the subsoil that contains plinthite perches water for short periods during winter and spring. Slope and the hazard of erosion are the main limitations.

Most of the acreage is wooded (fig. 4). A small acreage is in pasture. Suitable crops are corn, oats,

Figure 4.—Stand of slash pine on Malbis fine sandy loam, 1 to 5 percent slopes.

soybeans, grain sorghum, and truck crops. Suitable pasture plants are common bermudagrass, Coastal bermudagrass, ryegrass, Pensacola bahiagrass, and crimson clover. This soil is friable and is easy to keep in good tilth, but the surface layer erodes readily when the soil is clean tilled. Contour cultivation or terraces help to reduce erosion. Crop residue management and green-manure crops help to reduce erosion and to improve fertility. Response of crops to fertilizer is good. Lime is generally needed. Capability unit IIIe–2; woodland suitability group 2o1.

McKamie Series

The McKamie series consists of well-drained, very slowly permeable soils on uplands. These soils have a loamy surface layer and a clayey subsoil. They formed in clayey alluvial sediment.

In a representative profile the surface layer is dark-brown very fine sandy loam about 5 inches thick. The subsoil is red clay to a depth of 58 inches. The underlying material is very fine sandy loam mottled with pinkish gray, pink, and strong brown.

Most of the acreage of these soils is wooded. A small acreage is in pasture.

Representative profile of McKamie very fine sandy loam, 1 to 5 percent slopes, in Kisatchie National Forest, south side of road 208, NE¼SE¼ sec. 1, T. 2 N., R. 2 W.:

A1—0 to 5 inches, dark-brown (10YR 4/3) very fine sandy loam; weak, fine, granular structure; friable; strongly acid; abrupt, wavy boundary.

B21t—5 to 15 inches, red (2.5YR 4/6) clay; strong, medium, subangular blocky structure; firm; thin, continuous clay films; very strongly acid; gradual, wavy boundary.

B22t—15 to 26 inches, red (2.5YR 4/6) clay; few, fine, faint, yellowish-red mottles; strong, medium, subangular blocky structure; firm; thin, continuous clay films; very strongly acid; gradual, wavy boundary.

B23t—26 to 42 inches, red (2.5YR 4/6) clay; many, medium, distinct, yellowish-red (5YR 5/6) mottles; strong, coarse, subangular blocky structure; firm; reddish-yellow silt coatings about 1 millimeter thick on peds; thin, gray silt coatings at bottom of horizon; very strongly acid; gradual, wavy boundary.

B3—42 to 58 inches, red (2.5YR 4/6) clay; common, medium, distinct, reddish-yellow (5YR 6/6) mottles; massive; firm; very strongly acid; gradual, wavy boundary.

IIC—58 to 67 inches, mottled pinkish-gray (7.5YR 7/2), pink (7.5YR 7/4), and strong-brown (7.5YR 5/8) very fine sandy loam; massive; friable; mildly alkaline.

The A horizon is dark grayish-brown or dark-brown very fine sandy loam. The Bt horizon is red clay mottled with yellowish red and reddish yellow in the lower part. It is strongly acid or very strongly acid. The C horizon is reddish, pinkish, or brownish and is mottled with yellow and gray. It is strongly acid to mildly alkaline. The C horizon is stratified silt loam, very fine sandy loam, or silty clay loam.

McKamie soils are associated with Acadia, Gore, and Morse soils. They are better drained than Acadia and Gore soils. They are more clayey in the upper part of the B horizon than Acadia soils. McKamie soils are more acid and do not have calcium carbonate, which is typical of Morse soils.

McC—McKamie very fine sandy loam, 1 to 5 percent slopes. This is a very gently sloping to gently sloping, well-drained soil on ridgetops and side slopes on uplands. It has a loamy surface layer and a clayey subsoil. It has the profile described as representative of the series.

Included in mapping are small areas of Acadia, Gore, and Morse soils.

This soil has low natural fertility. Runoff is medium after rains, and water moves very slowly through the subsoil. A seasonal high water table is below a depth of 6 feet. The high shrink-swell potential of the clayey subsoil and low strength are the main limitations.

Most of the acreage is wooded. A small acreage is in pasture. Suitable crops are grain sorghum, oats, and soybeans. Suitable pasture plants are common bermudagrass, Pensacola bahiagrass, crimson clover, tall fescue, weeping lovegrass, and ryegrass. This soil erodes readily when used for cultivated crops. Terraces and contour cultivation help to reduce erosion. Capability unit IIIe–4; woodland suitability group 3c2.

McD—McKamie very fine sandy loam, 5 to 12 percent slopes. This is a moderately sloping to strongly sloping, well-drained soil on uplands. It has a loamy surface layer and a clayey subsoil.

Included with this soil in mapping are small areas of Gore and Morse soils. In some places the loamy surface layer has been lost through erosion.

This soil has low natural fertility. Runoff is rapid after rains, and water moves very slowly through the subsoil. A seasonal high water table is below a depth of 6 feet. The high shrink-swell potential of the clayey subsoil, low strength, and slope are the main limitations.

Most of the acreage is wooded. This soil is not suited to crops and is poorly suited to pasture because of slope. Suitable pasture plants are common bermudagrass and Pensacola bahiagrass. Capability unit VIe–2; woodland suitability group 3c2.

Moreland Series

The Moreland series consists of somewhat poorly drained, very slowly permeable soils. These soils have a clayey subsoil. They formed in clayey sediment on the Red River alluvial plain.

In a representative profile the surface layer is dark reddish-brown clay about 12 inches thick. The subsoil extends to a depth of 64 inches. It is dark reddish-brown silty clay that has few gray mottles.

Most of the acreage of these soils is wooded, cultivated, or in pasture.

Representative profile of Moreland clay, 0 to 1 percent slopes, in Dean Lee Agricultural Center, 1,320 feet west of Chatlin Lake Canal on north side of graded road, 60 feet in the field, Spanish Land Grant, sec. 61, T. 2 N., R. 1 E.:

Ap—0 to 4 inches, dark reddish-brown (5YR 3/2) clay; moderate, fine, granular structure; firm; mildly alkaline; clear, smooth boundary.

A11—4 to 12 inches, dark reddish-brown (5YR 3/3) clay; moderate, fine, subangular blocky structure; firm; few, fine, soft, black bodies; pressure faces; mildly alkaline; gradual, wavy boundary.

B21—12 to 22 inches, dark reddish-brown (5YR 3/4) silty clay; moderate, fine, subangular blocky structure; firm; mildly alkaline; gradual, wavy boundary.

B22—22 to 50 inches, dark reddish-brown (5YR 3/4) silty clay; few, fine, faint, gray mottles; strong, fine, angular blocky structure; firm; distinct slickensides; few, fine, black concretions; common, fine and medium carbonate spots that have hard centers; moderately alkaline; strongly effervescent; gradual, wavy boundary.

B3—50 to 64 inches, reddish-brown (5YR 4/4) silty clay; few, medium, distinct, dark-gray mottles; weak, coarse, angular blocky structure; firm; few slickensides; few, fine, black concretions; few fine carbonate spots that have hard centers; moderately alkaline.

The A horizon is dark reddish-brown or dark-brown clay or silty clay loam. It is neutral or mildly alkaline. The B horizon ranges from dark reddish brown to reddish brown and is faintly mottled with gray. It is clay or silty clay and is moderately alkaline and calcareous. Soft carbonate spots and scattered dark concretions are common. Depth to the C horizon is 40 inches or more. It is silt loam, silty clay loam, or silty clay. Buried horizons may occur.

Moreland soils are associated with Latanier, Gallion, Norwood, and Perry soils. They are finer textured in the lower part of the profile than Latanier soils. They are finer textured and more poorly drained than Norwood and Gallion soils. They are not so gray or so acid as Perry soils.

MdA—Moreland silty clay loam, 0 to 1 percent slopes. This nearly level, somewhat poorly drained soil is on the Red River alluvial plain between natural levees and backswamps. It has a profile similar to the one described as representative of the series, but the surface layer is dark reddish-brown silty clay loam about 9 inches thick.

Included with this soil in mapping are small areas of Latanier and Norwood soils and Moreland clay.

This soil has high natural fertility. Runoff is slow, and water moves very slowly through the subsoil. The soil is wet for long periods during winter and spring. A seasonal high water table is at a depth of 1 to 3 feet from December through April. This soil has a high shrink-swell potential: cracks about ½ inch wide and 20 inches or more deep form during dry periods and seal over during wet periods. This soil is hard when dry and sticky when wet. Wetness, low strength, and the very high shrink-swell potential are the main limitations.

Most of the acreage is wooded and in pasture, and a small acreage is only wooded. Suitable crops are oats, sugarcane, rice, grain sorghum, cotton, and soybeans. Corn is not well suited. Suitable pasture plants are common bermudagrass, Coastal bermudagrass, ryegrass, tall fescue, white clover, and Pensacola bahiagrass. Proper crop residue management improves tilth. This soil can be worked only within a fairly narrow range of moisture conditions. A surface drainage system is needed for cultivated crops and pasture. Response of most crops to nitrogen fertilizer is good. Capability unit IIIw–4; woodland suitability group 2w6.

MnA—Moreland clay, 0 to 1 percent slopes. This nearly level, somewhat poorly drained, clayey soil is on the Red River alluvial plain (fig. 5). This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of Latanier soils and Moreland silty clay loam.

This soil has high natural fertility. Runoff is slow,

Figure 5.—**Catfish ponds on an area of Moreland clay, 0 to 1 percent slopes.**

and water moves very slowly through the soil. It can be worked only over a narrow range of moisture conditions. A seasonal high water table is at a depth of 1 to 3 feet from December through April. Cracks about ½ inch wide and 20 or more inches deep form during dry periods and seal over during wet periods. The soil is hard when dry and sticky when wet. Wetness, low strength, and a very high shrink-swell potential are the main limitations.

Most of the acreage is wooded, cultivated, or in pasture. Suitable crops are soybeans, rice, sugarcane, grain sorghum, oats, and cotton. Suitable pasture plants include common bermudagrass, Coastal bermudagrass, tall fescue, Pensacola bahiagrass, and white clover. It is difficult to keep the soil in good tilth because of the clayey surface layer. Proper crop residue management improves tilth. A surface drainage system is needed for cultivated crops and pasture production. Response of most crops to nitrogen fertilizer is good. Capability unit IIIw–5; woodland suitability group 2w6.

MnB—Moreland clay, gently undulating. This soil is at low elevations on short irregular slopes in a ridge-and-swale topography on the Red River alluvial plain. It is a somewhat poorly drained, clayey soil. It has slopes of 0 to 3 percent.

Included with this soil in mapping are small areas of Latanier soils and Moreland clay that are nearly level.

This soil has high natural fertility. Runoff is medium on ridges and very slow in swales. Water moves very slowly through the soil and accumulates in swales for short periods after rains. A seasonal high water table is at a depth of 1 to 3 feet from December through April. The soil has a very high shrink-swell potential: cracks about ½ inch wide and 20 inches or more deep form in dry periods and seal over in wet periods. It is hard when dry and sticky when wet. Wetness, low strength, shrink-swell potential, and the short, irregular slopes are the main limitations.

Most of the acreage is wooded. A small acreage is in crops and pasture. Suitable crops are cotton, soybeans, grain sorghum, sugarcane, and oats. Suitable pasture plants are common bermudagrass, Coastal bermudagrass, Pensacola bahiagrass, tall fescue, and white clover. Wetness in swales may delay planting and harvesting of crops. It is difficult to keep the soils in good tilth because of the clayey surface layer, but proper crop residue management improves tilth. This soil can be worked only within a narrow range of moisture content. Response of most crops to nitrogen fertilizer is good. A surface drainage system is needed if this soil is used for crops and pasture. Capability unit IIIw–6; woodland suitability group 2w6.

MoA—Moreland clay, 0 to 1 percent slopes, occasionally flooded. This level, somewhat poorly drained, clayey soil is at low elevations on the Red River alluvial plain. It has a profile similar to the one described as representative of the series, but the buried layers are at a depth of about 30 inches in most areas.

Included with this soil in mapping are small areas of soils that are not subject to flooding and of Latanier soils.

This soil has high natural fertility. Runoff is very slow, and water moves very slowly through the soil. This soil is subject to occasional flooding to a depth of 1 to 5 feet late in winter and early in spring. A seasonal high water table is at a depth of 1 to 3 feet from December through April. Cracks about ½ inch wide and 20 inches or more deep form during dry periods and seal over in wet periods. The soils are hard when dry and sticky when wet. Flooding, wetness, low strength, and a very high shrink-swell potential are the main limitations.

Most of the acreage is wooded. A small acreage is in pasture. This soil is suited to short-season crops that can be grown between periods of flooding. Soybeans and grain sorghum are suitable crops. Suitable pasture plants are common bermudagrass and Pensacola bahiagrass. It is difficult to keep the soil in good tilth because of the clayey surface layer. Grazing is restricted during periods of flooding. Capability unit IVw–1; woodland suitability group 3w6.

MrA—Moreland clay, 0 to 1 percent slopes, frequently flooded. This level, somewhat poorly drained, clayey soil is at low elevations on the Red River alluvial plain. It has a profile similar to the one described as representative of the series, but buried layers are at a depth of about 30 inches in most areas.

Included with this soil in mapping are small areas of soils that flood occasionally and some areas of soils that are not subject to flooding.

This soil has high natural fertility. Runoff is very slow, and water moves very slowly through the soil. A seasonal high water table is at a depth of 1 to 3 feet from December through April. This soil is subject to frequent flooding to a depth of 2 to 6 feet during winter, spring, and early summer. Cracks about ½ inch wide and 20 inches or more deep form during dry periods and seal over in wet periods. These soils are hard when dry and sticky when wet. Flooding, a very high shrink-swell potential, wetness, and low strength are the main limitations.

Most of the acreage of this soil is wooded. This soil is not suited to crops because of the hazard of flooding. Suitable pasture plants are common bermudagrass and Pensacola bahiagrass. Grazing is restricted during

periods of flooding. Capability unit Vw–1; woodland suitability group 3w6.

Morse Series

The Morse series consists of well-drained, very slowly permeable, clayey soils on uplands. These soils formed in clayey alluvial sediment.

In a representative profile the surface layer is mixed very dark gray and dark-brown clay about 6 inches thick. The next layer is dark-brown clay about 12 inches thick. The underlying material is reddish-brown and yellowish-red clay that has many concretions of calcium carbonate.

Most of the acreage of these soils is wooded.

Representative profile of Morse clay, 1 to 5 percent slopes, 2.8 miles west of Otis, 100 feet north of gravel road, SE¼SE¼ sec. 22, R. 4 W., T. 3 N.:

A1—0 to 6 inches, very dark-gray (10YR 3/1) and dark-brown (7.5YR 4/2) clay; weak, medium, granular structure; plastic; moderately alkaline; slightly effervescent; clear, wavy boundary.

AC—6 to 18 inches, dark-brown (7.5YR 4/4) clay; weak, medium, subangular blocky structure; plastic; few vertical cracks filled with very dark gray clay; moderately alkaline; strongly effervescent; clear, wavy boundary.

C1—18 to 28 inches, reddish-brown (5YR 4/4) clay; weak, very coarse, subangular blocky structure parting to weak, fine, granular; very plastic; few, large pockets of brown clay; concretions of calcium carbonate; large slickensides that intersect in the lower part; moderately alkaline; strongly effervescent; gradual, wavy boundary.

C2—28 to 36 inches, yellowish-red (5YR 4/6) clay; moderate, coarse, subangular blocky structure; very plastic; few roots, mainly along cleavage planes; common concretions of carbonate as much as 1½ centimeters in diameter; large slickensides that intersect; few, black stains on peds; moderately alkaline; strongly effervescent; gradual, wavy boundary.

C3—36 to 50 inches, yellowish-red (5YR 4/6) clay; weak, coarse, subangular blocky structure; very plastic; few roots, mainly along cleavage plains; discontinuous stratum and coarse pockets of brown, soft masses of carbonate-enriched soil; concretions of carbonate as much as 2½ centimeters in diameter; few, black stains on peds; many intersecting slickensides; moderately alkaline; strongly effervescent; gradual, wavy boundary.

C4—50 to 74 inches, yellowish-red (5YR 4/6) clay; coarse, light brownish-gray pockets; massive; very plastic; common, coarse pockets of brown carbonate materials; common concretions of carbonate; many intersecting slickensides; moderately alkaline; strongly effervescent; abrupt, smooth boundary.

IIC5—74 to 84 inches, yellowish-red (5YR 4/6) very fine sandy loam; massive; very friable; moderately alkaline; strongly effervescent.

The A horizon ranges in thickness from 1 inch on the micro ridgetops to approximately 8 inches in the micro swales. It is dark reddish brown, very dark gray, or dark brown and is neutral to moderately alkaline. The C horizon is red, yellowish red, or reddish brown. It is mildly alkaline or moderately alkaline. Concretions of calcium carbonate are common.

Morse soils are associated with Gore and McKamie soils. They are better drained than Gore soils. Morse soils are more alkaline than Gore or McKamie soils and have concretions of carbonate, which those soils lack.

MsC—Morse clay, 1 to 5 percent slopes. This very gently sloping to gently sloping, well-drained, clayey soil is on ridgetops on uplands.

Included with this soil in mapping are small areas of Gore and McKamie soils.

This soil has low natural fertility. Runoff is medium to rapid, and water moves very slowly through the soil. A seasonal high water table is below a depth of 6 feet. The soil has an irregular topography, consisting of very small ridges and swales, commonly called a hog wallow condition. It has a very high shrink-swell potential and has cracks about ½ inch wide and 20 inches or more deep during dry periods. Low strength and the very high shrink-swell potential are the main limitations.

Most of the acreage is in poor-quality woodland. A small acreage is in pasture. This soil is poorly suited to crops, but grain sorghum and soybeans can be grown. It is poorly suited to pasture, but King Ranch bluestem and Pensacola bahiagrass can be grown. Poor trafficability during wet periods restricts use of equipment. Crop residue management and contour cultivation or terraces help to reduce erosion. Capability unit IVe–2; woodland suitability group 5t0.

Mowata Series

The Mowata series consists of poorly drained, very slowly permeable soils on low areas on uplands. These soils have a loamy surface layer and a clayey subsoil.

In a representative profile the surface layer is dark-gray silt loam about 6 inches thick. The subsurface layer is gray silt loam about 14 inches thick. The subsoil extends to a depth of 49 inches. It is gray and light brownish-gray silty clay mottled with shades of brown.

Most of the acreage of these soils is in pasture.

Representative profile of Mowata silt loam, ½ mile south of road junction along field road, NW¼SE¼ sec. 29, T. 5 N., R. 2 E.:

Ap—0 to 6 inches, dark-gray (10YR 4/1) silt loam; common, medium, faint, yellowish-brown (10YR 5/6) mottles; weak, coarse, subangular blocky structure; friable; neutral; gradual, wavy boundary.

A2g—6 to 20 inches, gray (10YR 5/1) silt loam; few, medium, faint, yellowish-brown mottles; massive; friable; many, fine

pinholes; tongues 1½ to 4 inches wide extend to a depth of 32 inches; slightly acid; abrupt, irregular boundary.

B21tg—20 to 35 inches, gray (10YR 5/1) silty clay; moderate, coarse, faint, yellowish-brown (10YR 5/8) and dark-brown (7.5YR 4/4) mottles; moderate, medium, subangular blocky structure; firm; thin, distinct, discontinuous clay films; medium acid; gradual, wavy boundary.

B22tg—35 to 49 inches, light brownish-gray (10YR 6/2) silty clay; common, medium, faint, yellowish-brown (10YR 5/8) mottles; moderate, medium, subangular blocky structure; plastic; thick, continuous clay films; many fine concretions of iron and manganese; slightly acid; gradual, wavy boundary.

C—49 to 96 inches, mottled gray (10YR 6/1) and light olive-brown (2.5Y 5/6) silty clay; massive; firm; few, coarse concretions of calcium carbonate accompanied by fine, soft, rounded masses of calcium carbonate; few slickensides in lower part; moderately alkaline.

The A horizon ranges from 15 to 20 inches in thickness. It is slightly acid to neutral. The A1 or Ap horizon is dark gray or gray. The A2 horizon is light gray or gray mottled with yellowish brown. The B2t horizon is gray or light brownish gray mottled with yellowish brown. It is medium acid or slightly acid. The C horizon is gray and brown. It is mildly alkaline or moderately alkaline.

Mowata soils are associated with Crowley soils and Paleudalfs. Mowata soils have tongues of A horizon material extending into the B horizon, unlike Crowley soils. Mowata soils are more poorly drained than Paleudalfs.

Mw—Mowata silt loam. This soil is in low areas on uplands. It has a loamy surface layer and a clayey subsoil. This soil is poorly drained. It has slopes of 0 to 1 percent.

Included with this soil in mapping are small areas of Crowley silt loam.

This soil has low natural fertility. Runoff is very slow, and water moves very slowly through the subsoil. This soil is wet during most of winter and spring. Wetness causes poor aeration and restricts root development. A seasonal high water table is at a depth of 1½ feet from December through April. Water stands in some areas for short periods after heavy rains. Plants are likely to be damaged by a lack of moisture during summer and fall. The surface layer is subject to piping and erosion when used as construction material. Wetness, low strength, and the high shrink-swell potential of the clayey subsoil are the main limitations.

Most of the acreage is in pasture. Suitable crops are soybeans, rice, grain sorghum, and sweet potatoes. Suitable pasture plants are common bermudagrass, Pensacola bahiagrass, tall fescue, and southern wild winter pea. Surface crusting is common, and the soil is somewhat difficult to keep in good tilth. Proper management of crop residue and green-manure crops help to improve these conditions. Surface drainage is generally needed for crops and pasture. Response of crops to fertilizer is fairly good. Lime is generally needed. Capability unit IIIw–7; woodland suitability group 2w9.

Norwood Series

The Norwood series consists of well-drained, moderately permeable, loamy soils. These soils formed in loamy sediment on natural levees on the Red River alluvial plain.

In a representative profile the surface layer is reddish-brown silt loam about 6 inches thick. The underlying material is stratified with reddish-brown silt loam, very fine sandy loam, and silty clay loam.

Most of the acreage is in crops. The rest is mostly in pasture.

Representative profile of Norwood silt loam, on north side of Hot Wells road (Louisiana Highway 121), southwest corner of Spanish Land Grant, sec. 129, T. 4 N., R. 3 W.:

Ap—0 to 6 inches, reddish-brown (5YR 5/4) silt loam; weak, fine, granular structure; very friable; mildly alkaline; strongly effervescent; clear, smooth boundary.

C1—6 to 16 inches, reddish-brown (5YR 4/4) silt loam; massive; friable; few remnants of bedding planes; moderately alkaline; strongly effervescent; clear, smooth boundary.

C2—16 to 23 inches, reddish-brown (5YR 5/4) silt loam; weak, thin, platy structure; very friable; distinct bedding planes; moderately alkaline; strongly effervescent; clear, smooth boundary.

C3—23 to 33 inches, reddish-brown (5YR 5/4) silt loam; massive; very friable; distinct bedding planes; moderately alkaline; strongly effervescent; clear, smooth boundary.

C4—33 to 41 inches, reddish-brown (5YR 4/4) silty clay loam; massive; friable; distinct bedding planes; many, dark concretions; dark stains in fine root channels; moderately alkaline; strongly effervescent; clear, smooth boundary.

C5—41 to 49 inches, reddish-brown (5YR 4/4) silt loam; massive; friable; distinct bedding planes; many dark stains on peds; moderately alkaline; strongly effervescent; clear, smooth boundary.

C6—49 to 55 inches, reddish-yellow (5YR 6/6) very fine sandy loam; massive; very friable; moderately alkaline; strongly effervescent; abrupt, smooth boundary.

C7—55 to 67 inches, reddish-brown (5YR 4/4) silty clay loam; weak, coarse, subangular blocky structure; firm; many, dark stains on peds; few, medium concretions of calcium carbonate; moderately alkaline; strongly effervescent; abrupt, smooth boundary.

C8—67 to 76 inches, reddish-brown (5YR 4/4) silt loam; massive; friable; moderately alkaline; strongly effervescent.

The A horizon is dark reddish-brown, reddish-brown,

or brown silt loam or silty clay loam. It is neutral to mildly alkaline. The C horizon is reddish brown, light reddish brown, or reddish yellow. It is stratified silt loam, very fine sandy loam, and silty clay loam.

Norwood soils are associated with Gallion, Latanier, Moreland, and Roxana soils. They are more alkaline than Gallion soils and do not have a B horizon, which is typical of Gallion soils. Norwood soils are coarser textured and better drained than Latanier and Moreland soils. Norwood soils are finer textured and more alkaline than Roxana soils.

Nd—Norwood silt loam. This soil is on natural levees on the Red River alluvial plain. It is well drained and loamy. This soil has slopes of 0 to 1 percent. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of Roxana and Latanier soils. Also included are small areas of soils on ridges and in swales and a few areas of soils locally known as salt spots, 1 to 5 acres in size, oval or elongated in shape, and located on the natural levee of Bayou Boeuf. The growth of crops and pasture plants is severely reduced on these salt spots.

This soil has high natural fertility. Movement of water and air through the soil is moderate. Roots penetrate easily. This soil is one of the first on the Red River alluvial plain to dry out in spring. Water stands in low areas for a short period after heavy rains. A seasonal high water table is generally below a depth of 6 feet from December through April, but in some places it is at a depth of 2 to 6 feet. There are no significant limitations.

Most of the acreage is in crops. A small acreage is in pasture. A large part of the city of Alexandria and the towns of Boyce, Cheneyville, and LeCompte are on this soil. This soil is one of the choice soils for crops. Suitable crops are corn, cotton (fig. 6), soybeans, sugarcane, grain sorghum, sweet potatoes, oats, and truck crops. Suitable pasture plants are Coastal bermudagrass, common bermudagrass, Pensacola bahiagrass, ryegrass, tall fescue, and white clover. This soil is friable and is easy to keep in good tilth, but surface crusting is likely when the soil is clean tilled. If this soil is cultivated, traffic pans develop easily, but they can be broken by chiseling or deep plowing. A drainage system is generally needed to remove excess surface water from low areas. Land smoothing improves surface drainage and increases efficiency of farm equipment. Response of crops to nitrogen fertilizer is good. Capability unit I–1; woodland suitability group 1o4.

Nw—Norwood silty clay loam. This soil is on natural levees on the Red River alluvial plain. It is well drained and loamy. It has slopes of 0 to 1 percent. This soil has a profile similar to the one described as representative of the series, but it has a silty clay loam surface layer.

Included with this soil in mapping are small areas of Norwood silt loam and Roxana and Latanier soils.

Figure 6.—Cotton growing on an area of Norwood silt loam.

This soil has high natural fertility. Runoff is slow. Movement of water and air through the soil is moderate. Roots penetrate fairly easily. Excess surface water accumulates after heavy rains. A seasonal high water table is generally below a depth of 6 feet from December through April, but in places it is at a depth of 1½ to 6 feet. Wetness is the main limitation.

Most of the acreage is in crops. A few areas are in pasture. This soil is one of the choice soils for crops. Suitable crops are corn, cotton, soybeans (fig. 7), sugarcane, grain sorghum, oats, and truck crops. Suitable pasture plants are common bermudagrass, Coastal bermudagrass, Pensacola bahiagrass, tall fescue, ryegrass, and white clover. The soil is somewhat difficult to keep in good tilth because of the silty clay loam surface layer. Proper crop residue management improves tilth. Wetness and poor trafficability of the surface layer restrict the use of farm machinery during wet periods. A drainage system is needed to remove excess surface water. Land smoothing and leveling help to improve surface drainage and to increase the efficiency of farm equipment. Response of crops to nitrogen fertilizer is good. Capability unit IIw–2; woodland suitability group 1o4.

Nugent Series

The Nugent series consists of excessively drained, moderately to rapidly permeable, loamy soils underlain by sandy sediment. These soils formed in sandy alluvial sediment on natural levees of streams that drain the uplands. Nugent soils are mapped only in a complex with Rexor soils.

In a representative profile the surface layer is dark-brown fine sandy loam about 7 inches thick. Below this is yellowish-brown stratified loamy fine sand and fine sandy loam.

Most of the acreage of these soils is wooded.

Representative profile of Nugent fine sandy loam in an area of Rexor-Nugent complex, frequently flooded, ⅓ mile south of Louisiana Highway 116, 50 feet east of Texas Gas Transmissions Line, Spanish Land Grant, sec. 29, T. 5 N., R. 1 E.:

A1—0 to 7 inches, dark-brown (10YR 4/3) fine sandy loam; weak, fine, granular structure; very friable; slightly acid; clear, smooth boundary.

C1—7 to 19 inches, yellowish-brown (10YR 5/4) loamy fine sand; weak, medium and coarse, subangular blocky structure; very friable; few, fine pores; few pockets of uncoated sand; strongly acid; clear, smooth boundary.

C2—19 to 29 inches, yellowish-brown (10YR 5/4) loamy fine sand; weak, coarse, subangular blocky structure; very friable; medium pockets of light grayish-brown uncoated sand; common, fine pores; very strongly acid; gradual, smooth boundary.

C3—29 to 50 inches, yellowish-brown (10YR 5/4)

Figure 7.—**Soybeans on an area of Norwood silty clay loam.**

fine sandy loam; weak, medium and coarse, subangular blocky structure; friable; pockets of pale-brown (10YR 6/3) sand; fine pores; very strongly acid; gradual, smooth boundary.

C4—50 to 90 inches, pale-brown (10YR 6/3) and brown (10YR 5/3) fine sandy loam; single grained; very friable; many pockets of uncoated sand; fine pores; very strongly acid.

The A horizon ranges from 6 to 10 inches in thickness. It is dark brown or dark grayish brown. The C horizon is brown, yellowish-brown, pale-brown, or light yellowish-brown fine sandy loam and loamy fine sand. The profile ranges from very strongly acid to slightly acid throughout.

Nugent soils are associated with Guyton and Rexor soils. They are more sandy and better drained than those soils.

Paleudalfs

Paleudalfs consist of moderately well drained, very slowly permeable soils on uplands. These soils have a loamy surface layer and a clayey subsoil. They formed in loamy alluvial sediment over clayey alluvial sediment.

In a representative profile the surface layer is dark grayish-brown silt loam about 9 inches thick. The subsoil is yellowish-brown silt loam to a depth of 14 inches and yellowish-brown silty clay loam mottled with shades of red and gray to a depth of 20 inches. Below a depth of 20 inches, the subsoil is yellowish-red and strong-brown clay mottled with shades of gray.

Most of the acreage of these soils is in crops and pasture.

Representative profile of Paleudalfs, 200 feet south of BM66, SE¼NW¼ sec. 35, T. 5 N., R. 3 E.:

A11—0 to 6 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; very friable; medium acid; gradual, smooth boundary.

A12—6 to 9 inches, dark grayish-brown (10YR 4/2) and yellowish-brown (10YR 5/4) silt loam; weak, medium, subangular blocky structure; very friable; many, fine, black concretions; medium acid; gradual, smooth boundary.

B1—9 to 14 inches, yellowish-brown (10YR 5/4) silt loam; weak, medium, subangular blocky structure; friable; many, fine, black and brown concretions; strongly acid; gradual, smooth boundary.

B21t—14 to 20 inches, yellowish-brown (10YR 5/4) silty clay loam; common, medium, distinct, yellowish-red (5YR 4/8) and light brownish-gray (10YR 6/2) mottles; moderate, medium and fine, subangular blocky structure; sticky, plastic; thin, patchy clay films; strongly acid; gradual, wavy boundary.

B22t—20 to 26 inches, yellowish-red (5YR 4/8) clay; light brownish-gray (10YR 6/2) coatings of silt 2 to 5 millimeters thick surrounding peds; moderate, medium, subangular blocky structure; plastic; thin, patchy clay films; medium acid; gradual, wavy boundary.

B23t—26 to 31 inches, strong-brown (7.5YR 5/6) clay; common, fine, distinct, light brownish-gray (10YR 6/2) mottles; moderate, medium, subangular blocky structure; plastic; prominent, discontinuous clay films; medium acid; clear, wavy boundary.

B24t—31 to 52 inches, strong-brown (7.5YR 5/6) clay; common, fine and medium, faint, pinkish-gray (7.5YR 7/2) mottles; moderate, medium, subangular blocky structure; plastic; thin, patchy clay films; medium acid; clear, wavy boundary.

B3—52 to 80 inches, light olive-brown (2.5Y 5/4) clay; common, medium, distinct, light brownish-gray (10YR 6/2) mottles; massive; firm; many, fine and medium, brown and black concretions; thin, patchy clay films; few pressure faces; mildly alkaline.

The A horizon ranges from 8 to 15 inches in thickness. It is dark grayish brown, dark gray, or dark brown and is strongly acid to medium acid. The lower part of the A horizon is mottled with yellowish brown. It is yellowish brown, strong brown, or yellowish red mottled with shades of red and gray. It is strongly acid or medium acid in the upper part and medium acid to mildly alkaline in the lower part. The B horizon is silty clay loam in the upper part and silty clay or clay in the lower part. Gray and light brownish-gray silt coatings are in the B22t horizon.

Paleudalfs are associated with Crowley and Mowata soils. They are better drained than those soils.

Pa—Paleudalfs. These soils are on broad, level ridgetops on uplands. They have a loamy surface layer and a clayey subsoil. They are moderately well drained. They have slopes of 0 to 1 percent.

Included in mapping are small areas of Crowley, Gore, and Acadia soils.

These soils have low natural fertility. Runoff is slow, and water and air move very slowly through the soil. Water perches above the clayey subsoil from December through April. Low strength and the high shrink-swell potential of the clayey subsoil are the main limitations.

Most of the acreage is in crops and pasture. Suitable crops are grain sorghum, oats, and soybeans. Suitable pasture plants are common bermudagrass, tall fescue, weeping lovegrass, Pensacola bahiagrass, ryegrass, and southern wild winter pea. These soils are friable and are fairly easy to keep in good tilth, but surface crusting is common if the soil is clean tilled. Proper management of crop residue and green-manure crops help to improve tilth and to reduce crusting. Proper row direction and contour cultivation help to reduce erosion. Surface drainage is generally needed for crops and pasture. Response of crops to fertilizer is fairly good. Lime is generally needed. Capability unit IIIw–3; woodland suitability group 3w8.

Perry Series

The Perry series consists of poorly drained, very

slowly permeable, clayey soils. These soils formed in clayey alluvial sediment on the Red River alluvial plain.

In a representative profile the surface layer is gray clay about 6 inches thick. The subsoil is clay to a depth of 44 inches. The upper 11 inches is gray, and the lower 27 inches is dark reddish-brown. The underlying material is reddish-brown clay.

Most of the acreage of these soils is wooded.

Representative profile of Perry clay, frequently flooded, 0.3 mile south of gravel road to pipeline, 200 feet into woods, Spanish Land Grant, sec. 35, T. 4 N., R. 3 W.:

A1—0 to 6 inches, gray (10YR 5/1) clay; common, medium, distinct, brown (7.5YR 5/4) mottles; moderate, medium, subangular blocky structure; very firm; medium acid; abrupt, smooth boundary.

B2g—6 to 17 inches, gray (10YR 5/1) clay; common, medium, distinct, strong-brown (7.5YR 5/6) mottles; moderate, medium, subangular blocky structure; firm; few slickensides; neutral; clear, smooth boundary.

IIB3—17 to 44 inches, dark reddish-brown (5YR 3/4) clay; common, medium, faint, reddish-gray (5YR 5/2) mottles; strong, medium, subangular blocky structure; firm; slickensides; moderately alkaline; slightly effervescent; clear, wavy boundary.

IIC—44 to 68 inches, reddish-brown (5YR 4/4) clay; few, fine, faint, gray mottles; massive; moderately alkaline; slightly effervescent.

The A horizon ranges from 4 to 6 inches in thickness. It is gray, dark gray, or grayish brown and is strongly acid or medium acid. The B horizon is slightly acid to neutral. The B2 horizon is gray or dark gray mottled with shades of brown and red. Depth to the IIB horizon is 10 to 20 inches. The IIB3 horizon is dark reddish brown or reddish brown mottled with gray or reddish gray. The IIC horizon is reddish brown, reddish gray, or dark reddish gray.

Perry soils are associated with Moreland and Latanier soils. They are more poorly drained and more acid than those soils and do not have a loamy C horizon, which is typical of Latanier soils. Perry soils are similar to Alligator soils, but unlike those soils the lower part of their B horizon is reddish in color and moderately alkaline in reaction.

Pe—Perry clay, frequently flooded. This soil is at the lowest elevation on the Red River alluvial plain. It is a poorly drained, clayey soil. This soil has slopes of 0 to 1 percent.

Included with this soil in mapping are small areas of Moreland and Latanier soils.

This soil has medium natural fertility. Runoff is very slow, and water moves very slowly through the soil. The soil is subject to frequent flooding, generally during spring and early summer, to a depth of 2 feet. A seasonal high water table is at a depth of 0 to 1½ feet from December through April. This soil is wet for long periods after rains. Cracks about ½ inch wide and 20 inches or more deep form during dry periods and seal over in wet periods. The soil is hard when dry and sticky when wet. Flooding, a very high shrink-swell potential, and wetness are the main limitations.

Most of the acreage is wooded (fig. 8). A small acreage is in pasture. Flooding severely restricts use of this soil for crops. Common bermudagrass and Pensacola bahiagrass are suitable pasture plants, but flooding restricts grazing time. Capability unit Vw–1; woodland suitability group 3w6.

Rexor Series

The Rexor series consists of well-drained, moderately permeable, loamy soils. These soils formed in loamy alluvial sediment on natural levees of streams that drain uplands.

In a representative profile the surface layer is dark-brown and dark yellowish-brown silt loam about 10 inches thick. The subsoil to a depth of 73 inches is yellowish brown and dark yellowish brown silt loam. The upper 20 inches is mottled with shades of brown. The lower 43 inches is mottled with shades of brown and gray.

Most of the acreage of these soils is wooded.

Representative profile of Rexor silt loam, in an area of Rexor-Nugent complex, frequently flooded, on Spring Creek, 150 feet east of Louisiana Highway 488, NE¼SE¼ sec. 8, T. 2 N., R. 3 W.:

A11—0 to 3 inches, dark-brown (10YR 4/3) silt loam; weak, fine, granular structure; friable; medium acid; abrupt, wavy boundary.

A12—3 to 10 inches, dark yellowish-brown (10YR 3/4) silt loam; weak, medium, fine, subangular blocky structure; friable; few, fine, black concretions; strongly acid; clear, wavy boundary.

B1—10 to 17 inches, yellowish-brown (10YR 5/4) silt loam; many, coarse, faint, dark-brown (10YR 4/3) mottles; weak, medium, subangular blocky structure; friable; few pores; common, fine, black concretions; very strongly acid; clear, wavy boundary.

B21t—17 to 30 inches, dark yellowish-brown (10YR 3/4) silt loam; many, medium, faint, yellowish-brown (10YR 5/4) mottles; weak, coarse, subangular blocky and weak, coarse, platy structure; friable; slightly more clayey than B1 horizon; few, thin coatings of silt on peds; thin, patchy clay films on peds; strongly acid; clear, wavy boundary.

B22t—30 to 41 inches, brown (10YR 5/3) and yellowish-brown (10YR 5/4) silt loam; many, coarse, faint, light-gray (10YR 7/2) mottles and few, fine, faint, yellowish-brown and dark-brown mottles; weak, medium, subangular blocky structure; friable; light-gray silt pockets and silt coatings 1 to 2 millimeters thick on peds; fine, brown and black concretions; thin, patchy clay films; very strongly acid; clear, wavy boundary.

B23t—41 to 73 inches, yellowish-brown (10YR

Figure 8.—**Hardwood forest on an area of Perry clay, frequently flooded.**

5/4) silt loam; common, medium, faint, light brownish-gray (10YR 6/2) and pale-brown (10YR 6/3) mottles; moderate, medium and fine, subangular blocky structure; friable; common pores; thin silt coatings on peds; thin, patchy, dark-brown clay films on peds and in pores; pockets of light grayish-brown and pale-brown silt; very strongly acid.

The A horizon is dark brown, dark yellowish brown, or grayish brown. The Bt horizon is brown, dark yellowish brown, or yellowish brown. It is mottled with shades of brown in the upper part and with shades of gray and brown in the lower part. The profile ranges from medium acid to very strongly acid throughout.

Rexor soils are associated with Guyton and Nugent soils. They are better drained and more sandy than Guyton soils. They are not so sandy and excessively drained as Nugent soils.

Re—Rexor-Nugent complex, frequently flooded. This complex consists of loamy soils on alluvial plains of major streams that drain the uplands. It is subject to frequent flooding during winter and spring.

This mapping unit is about 65 percent Rexor soil and 25 percent Nugent soil. The rest is mostly Guyton soil. The Nugent soil is immediately adjacent to stream channels. The Rexor soil is at lower elevations on alluvial plains of streams. Slopes are 0 to 1 percent.

The Rexor soil is loamy throughout and has low natural fertility. Runoff is slow because this soil is nearly level. Movement of water through the soil is moderate. A seasonal high water table is at a depth of 1½ to 4 feet from December through April. This soil dries out more slowly than Nugent soil.

The Nugent soil has a loamy surface layer and is underlain by sandy material. It has low natural fertility. Runoff is slow, because infiltration is rapid. Water moves rapidly through this soil, and it dries out more quickly than the Rexor soil. A seasonal high water table is at a depth of 2 to 5 feet from December through April. Plants are likely to be damaged by a lack of moisture during summer and fall. Flooding is the main limitation.

Most of the acreage is in mixed hardwoods and pine trees. These soils are not suited to crops and are poorly suited to pasture, because flooding is frequent. Suitable pasture plants are common bermudagrass and Pensacola bahiagrass, but flooding restricts grazing time. Capability unit Vw–3; woodland suitability group 1o7.

Roxana Series

The Roxana series consists of well-drained, moderately permeable, loamy soils. These soils formed in loamy alluvial sediment on natural levees on the Red River alluvial plain.

In a representative profile the surface layer is reddish-brown very fine sandy loam about 4 inches

thick. The underlying material is stratified brown and yellowish-red loamy very fine sand and very fine sandy loam.

Most of the acreage of these soils is in crops and pasture.

Representative profile of Roxana very fine sandy loam, gently undulating, five-eighths of a mile northeast of Zimmerman, 150 feet east of gravel road in Spanish Land Grant, sec. 63, T. 5 N., R. 3 W.:

A1—0 to 4 inches, reddish-brown (5YR 4/4) very fine sandy loam; weak, fine, granular structure; very friable; mildly alkaline; abrupt, smooth boundary.

C1—4 to 13 inches, brown (7.5YR 4/4) loamy very fine sand; single grained (faint remnants of bedding planes throughout); very friable; mildly alkaline; clear, smooth boundary.

C2—13 to 22 inches, brown (7.5YR 4/4) very fine sandy loam; weak, thin, platy structure (bedding planes); very friable; mildly alkaline; clear, smooth boundary.

C3—22 to 47 inches, yellowish-red (5YR 4/6) very fine sandy loam; weak, thin, platy structure (bedding planes); very friable; few calcareous spots; mildly alkaline; abrupt, smooth boundary.

IIAb—47 to 52 inches, dark reddish-brown (5YR 3/4) sandy clay loam; weak, medium, subangular blocky structure; friable; mildly alkaline; slightly effervescent; abrupt, smooth boundary.

IIIC—52 to 70 inches, brown (7.5YR 4/4) fine sandy loam; single grained (faint bedding planes); very friable; mildly alkaline.

The A horizon is dark reddish-brown, reddish-brown, or yellowish-red. It is medium acid to moderately alkaline. The C horizon is yellowish-red or brown stratified loamy very fine sand, fine sandy loam, very fine sandy loam, or silt loam. It is neutral to moderately alkaline. The weighted average content of sand coarser than very fine is 10 to 15 percent. Buried and IIC horizons are common at a depth of 40 inches or more.

Roxana soils are associated with Norwood soils. Roxana soils are coarser textured, less alkaline, and less calcareous than Norwood soils.

RnB—Roxana very fine sandy loam, gently undulating. This is a well-drained, loamy soil. It is on ridges and swales of natural levees on the Red River alluvial plain. This soil has slopes of 0 to 3 percent. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of Norwood soils, some areas of soils that are seepy, and some small areas of soils at low elevations in swales that flood occasionally. Also included are some small areas of soils adjacent to the Red River that flood frequently and small areas of soils that have a surface layer of silt loam or loamy very fine sand.

This soil has high natural fertility. Runoff is slow, because infiltration is rapid. Roots penetrate easily. Movement of water and air through the soil is moderate. A seasonal high water table is generally below a depth of 6 feet from December through April, but in places it is at a depth of 3 to 6 feet. The ridge and swale topography is the main limitation.

Most of the acreage is in crops. The rest is in pasture. Suitable crops are cotton, corn, soybeans, grain sorghum, oats, sugarcane, and truck crops. Suitable pasture plants are common bermudagrass, Coastal bermudagrass, ryegrass, Pensacola bahiagrass, and white clover. This soil is friable and is easy to keep in good tilth. The short, irregular slopes restrict tillage operations. In places traffic pans form if the soil is cultivated, but they can be broken up by chiseling or deep plowing. Land smoothing improves surface drainage and increases efficiency of farm equipment, but a large yardage of earth must be moved. Response of crops to nitrogen fertilizer is good. Capability unit IIe–1; woodland suitability group 1o4.

Ro—Roxana very fine sandy loam, occasionally flooded. This is an undulating, well-drained, loamy soil that is subject to flooding. It is on ridges and swales of natural levees on the Red River alluvial plain. This soil is not protected from flooding by the Red River. It has slopes of 0 to 3 percent. This soil has a profile similar to the one described as representative of the series, but the surface layer is about 7 inches thick.

Included with this soil in mapping are some small areas of soils that are not subject to flooding, some small areas of soils that flood frequently, and Norwood soils. Also included are small areas of soils that have a surface layer of silt loam or loamy very fine sand.

This soil has high natural fertility. Runoff is slow, because infiltration is rapid. Movement of water and air through the soil is moderate. Roots penetrate easily. A seasonal high water table is generally below a depth of 6 feet from December through April, but in places it is at a depth of 3 to 6 feet. This soil is occasionally flooded during winter and spring. Flooding and the ridge and swale topography are the main limitations.

Most of the acreage is in pasture and crops. A small acreage is wooded. Suitable crops are soybeans, grain sorghum, and summer truck crops. Suitable pasture plants are common bermudagrass and Pensacola bahiagrass. This soil is friable and is easy to keep in good tilth. The short, irregular slopes restrict tillage operations. Land smoothing helps to improve surface drainage and to increase efficiency of farm equipment, but a large yardage of earth must be moved. Response of crops to nitrogen fertilizer is good. Capability unit IVw–2; woodland suitability group 1o4.

Rr—Roxana soils, frequently flooded. This is an undulating, well-drained, loamy soil that is subject to frequent flooding. It is on ridges and swales on the Red River alluvial plain adjacent to the Red River. This soil is not protected from flooding by the Red River. It has slopes of 0 to 3 percent. These soils have a profile similar to the one described as representative of the series, but the surface layer and the underlying material contain more sand.

Included with this soil in mapping are areas of sandy soils; areas of Roxana soils, occasionally flooded; and small areas of Norwood soils.

This soil has high natural fertility. Runoff is slow, because infiltration is rapid. Movement of water and air through the soil is moderate. Roots penetrate easily. A seasonal high water table is generally below a depth

of 6 feet from December through April, but in places it is at a depth of 2½ to 6 feet. High water stages on the Red River are likely to create a high water table in this soil, generally from December through June. Flooding is the main limitation.

Most of the acreage is wooded. Flooding severely restricts use for crops. Common bermudagrass and Pensacola bahiagrass are suitable pasture plants, but flooding restricts grazing time. Capability unit Vw–2; woodland suitability group 1o4.

Ruston Series

The Ruston series consists of well-drained, moderately permeable, loamy soils on uplands. These soils formed in loamy marine and alluvial sediment.

In a representative profile the surface layer is dark grayish-brown fine sandy loam about 5 inches thick. The subsurface layer is yellowish-brown fine sandy loam about 11 inches thick. The subsoil is red sandy clay loam to a depth of 67 inches.

Most of the acreage of these soils is wooded. A small acreage is in pasture.

Representative profile of Ruston fine sandy loam, 1 to 3 percent slopes, 4 miles southwest of Boyce, 200 feet south and 50 feet east of James Cemetery Road, Spanish Land Grant, sec. 40, T. 5 N., R. 4 W.:

A1—0 to 5 inches, dark grayish-brown (10YR 4/2) fine sandy loam; weak, medium, granular structure; friable; slightly acid; clear, smooth boundary.

A2—5 to 16 inches, yellowish-brown (10YR 5/4) fine sandy loam; weak, coarse, subangular blocky structure; friable; few, small, fine pockets of pale-brown sandy material; medium acid; clear, smooth boundary.

B21t—16 to 28 inches, red (2.5YR 4/6) sandy clay loam; moderate, medium, subangular blocky structure; friable; continuous clay film on peds; few, fine and coarse pebbles; very strongly acid; gradual, wavy boundary.

B22t—28 to 32 inches, red (2.5YR 4/6) sandy clay loam; moderate, medium, subangular blocky structure; friable; thin, continuous clay films on peds; very strongly acid; gradual, wavy boundary.

B&A'2—32 to 37 inches, red (2.5YR 4/8) fine sandy loam; weak, medium subangular blocky structure; slightly firm; few, scattered pockets of light-brown sandy material; few, patchy clay films; very strongly acid; gradual, wavy boundary.

B'2t—37 to 67 inches, red (2.5YR 4/8) sandy clay loam; weak, medium, subangular blocky structure; friable; few, medium pebbles; patchy clay films; few, scattered pockets of pale-red, coarse sand grains; very strongly acid.

The A horizon ranges from 8 to 18 inches in thickness. It is slightly acid to strongly acid. The A1 horizon is dark grayish brown, dark brown, grayish brown, or brown. The A2 horizon is pale brown, yellowish brown, or light yellowish brown. The B horizon is strongly acid or very strongly acid. The B2t horizon is yellowish red or red.

Ruston soils are associated with Eustis, Lucy, Malbis, Beauregard, and Smithdale soils. They have finer textured A and B horizons than Eustis soils and a finer textured A horizon than Lucy soils. Ruston soils have an A horizon less than 20 inches thick, whereas Lucy soils have an A horizon more than 20 inches thick. Ruston soils are better drained than Malbis and Beauregard soils. They have a bisequum, which Smithdale soils lack.

RsB—Ruston fine sandy loam, 1 to 3 percent slopes. This is a very gently sloping, well-drained, loamy soil on uplands. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of Malbis, Lucy, and Smithdale soils.

This soil has low natural fertility. Runoff is medium. Movement of water through the soil is moderate. Roots and moisture penetrate easily. A seasonal high water table is below a depth of 6 feet. The hazard of erosion is the main limitation.

Most of the acreage is wooded. A small acreage is in pasture. Suitable crops are corn, grain sorghum, oats, truck crops, and soybeans. Suitable pasture plants are common bermudagrass, Coastal bermudagrass, Pensacola bahiagrass, ryegrass, and crimson clover. The soil is friable and is easy to keep in good tilth, but erosion is a hazard if it is cultivated. Use of contour cultivation and terraces help to reduce erosion. Crop residue management and green-manure crops help to reduce erosion and to improve tilth. Response of crops to fertilizers is good. Lime is generally needed. Capability unit IIe–3; woodland suitability group 2o1.

RsC—Ruston fine sandy loam, 3 to 8 percent slopes. This is a gently sloping to moderately sloping, well-drained, loamy soil on uplands. It has a profile similar to the one described as representative of the series, but the surface layer is about 8 inches thick.

Included with this soil in mapping are small areas of Malbis, Lucy, and Smithdale soils and some areas of soils that are severely eroded.

This soil has low natural fertility. Runoff is rapid. Movement of water through the soil is moderate. Roots and moisture penetrate easily. A seasonal high water table is below a depth of 6 feet. Slope and the hazard of erosion are the main limitations.

Most of the acreage is wooded. A small acreage is in pasture. Suitable crops are corn, oats, grain sorghum, truck crops, and soybeans. Suitable pasture plants are common bermudagrass, Coastal bermudagrass, Pensacola bahiagrass, ryegrass, and crimson clover. The soil is friable and is easy to keep in good tilth, but it erodes readily if cultivated. Contour cultivation and terraces help to reduce erosion when the soil is used for crops. Crop residue management and green-manure crops help to reduce erosion and to improve tilth. Response of crops to fertilizer is good. Lime is generally needed. Capability unit IIIe–5; woodland suitability group 2o1.

Smithdale Series

The Smithdale series consists of well-drained, moderately permeable, loamy soils on uplands. These soils formed in loamy marine or alluvial sediment.

In a representative profile the surface layer is dark grayish-brown fine sandy loam about 5 inches thick. The subsurface layer is yellowish-brown fine sandy loam about 3 inches thick. The subsoil extends to a depth of about 51 inches. The upper 11 inches is red sandy clay loam, and the lower 32 inches is red fine sandy loam.

Most of the acreage of these soils is wooded.

Representative profile of Smithdale fine sandy loam, 8 to 12 percent slopes, 200 feet north of Bayou Clear, 5½ miles southeast of Must Road, SE¼NE¼ sec. 15, T. 2 N., R. 2 W.:

A1—0 to 5 inches, dark grayish-brown (10YR 4/2) fine sandy loam; moderate, medium, granular structure; friable; strongly acid; clear, smooth boundary.

A2—5 to 8 inches, yellowish-brown (10YR 5/4) fine sandy loam; weak, fine, granular structure; friable; strongly acid; clear, smooth boundary.

B21t—8 to 12 inches, red (2.5YR 4/8) sandy clay loam; moderate, medium, subangular blocky structure; friable; thin, continuous clay films on peds; very strongly acid; clear, wavy boundary.

B22t—12 to 19 inches, red (2.5YR 4/8) sandy clay loam; moderate, fine, subangular blocky structure; friable; thin, continuous clay films on peds; very strongly acid; gradual, wavy boundary.

B23t—19 to 27 inches, red (2.5YR 4/8) fine sandy loam; weak, fine, subangular blocky structure; friable; thin, patchy clay films on peds; very strongly acid; clear, wavy boundary.

B24t—27 to 45 inches, red (2.5YR 4/8) fine sandy loam; weak, fine, subangular blocky structure; friable; clay bridging and pores lined with clay; few pockets of clean sand; very strongly acid; clear, wavy boundary.

B25t—45 to 51 inches, red (2.5YR 4/6) fine sandy loam; few, fine, distinct, pinkish-gray, strong-brown, and brownish-yellow mottles; firm; distinct, continuous clay films; few streaks of uncoated sand; very strongly acid; clear, wavy boundary.

B3—51 to 80 inches, yellowish-red (5YR 5/8) fine sandy loam; weak, fine, subangular blocky structure; firm; clay bridging and pores lined with clay; very strongly acid.

The A horizon is strongly acid or medium acid. The A1 horizon is dark grayish brown, dark gray, or dark brown. The A2 horizon is yellowish brown or pale brown. The B horizon is strongly acid or very strongly acid. The upper part of the Bt horizon is red, and the lower part is red or yellowish red. The lower part has pockets of uncoated sand.

Smithdale soils are associated with Eustis, Lucy, and Ruston soils. They have finer textured A and B horizons than Eustis soils. They do not have a bisequum, which is typical of Ruston soils. Ruston soils have a thinner, finer textured A horizon than Lucy soils. Smithdale soils have a thicker B horizon than the otherwise similar Cahaba soils.

SmE—Smithdale fine sandy loam, 8 to 12 percent slopes. This is a strongly sloping, well-drained, loamy soil on the upper part of side slopes on uplands. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of Lucy and Ruston soils and areas of soils that have slopes of more than 12 percent. Also included are some areas of soils that are severely eroded.

This soil has low natural fertility. Runoff is rapid. Movement of water and air through the subsoil is moderate. Roots penetrate easily. A seasonal high water table is below a depth of 6 feet. Slope and the hazard of erosion are the main limitations.

Most of the acreage is wooded. Slope and the hazard of erosion are limitations to use of this soil for crops. Suitable crops are soybeans, grain sorghum, and oats. Suitable pasture plants are Coastal bermudagrass, common bermudagrass, Pensacola bahiagrass, ryegrass, and crimson clover. Terraces are needed to help to reduce erosion. Response of crops to fertilizer is good. Lime is generally needed. Capability unit IVe–3; woodland suitability group 2o1.

SmF—Smithdale fine sandy loam, 12 to 20 percent slopes. This is a moderately steep, well-drained, loamy soil on the lower part of side slopes on uplands. It has a profile similar to the one described as representative of the series, but the surface layer is thinner.

Included with this soil in mapping are small areas of Lucy and Ruston soils and small areas of soils that are severely eroded.

This soil has low natural fertility. Runoff is rapid. Movement of water and air through the soil is moderate. Roots penetrate easily. A seasonal high water table is below a depth of 6 feet. Slope and the hazard of erosion are the main limitations.

Most of the acreage is wooded. Slope and the hazard of erosion are severe limitations to use of this soil for crops. Suitable pasture plants are common bermudagrass, Coastal bermudagrass, Pensacola bahiagrass, ryegrass, and crimson clover. Capability unit VIe–1; woodland suitability group 2o1.

Urbo Series

The Urbo series consists of somewhat poorly drained, very slowly permeable soils on alluvial plains of streams that drain the uplands. These soils have a loamy surface layer and a clayey subsoil.

In a representative profile the surface layer is silty clay loam about 12 inches thick. It is dark grayish brown in the upper part and light brownish gray in the lower part. The subsoil, to a depth of 50 inches, is grayish-brown silty clay.

Most of the acreage of these soils is in pasture. The rest is mostly wooded.

Representative profile of Urbo silty clay loam, frequently flooded, 200 feet southwest of barn, sec. 21, T. 4 N., R. 4 W.:

Ap—0 to 6 inches, dark grayish-brown (10YR 4/2) silty clay loam; weak, medium, granular structure; friable; organic stains along root channels; strongly acid; clear, smooth boundary.

A1—6 to 12 inches, light brownish-gray (2.5Y 6/2) silty clay loam; few, fine, faint,

yellowish-brown mottles; weak, medium to coarse, subangular blocky structure; friable; strongly acid; clear, wavy boundary.

B21g—12 to 50 inches, grayish-brown (2.5Y 5/2) silty clay; few, fine, faint, yellowish-brown mottles; weak, coarse, subangular blocky structure; firm; very strongly acid; clear, wavy boundary.

B22g—50 to 57 inches, light brownish-gray (2.5Y 6/2) silty clay; common, medium, prominent, strong-brown (7.5YR 5/6) mottles and few, fine, prominent, yellowish-red mottles; weak, coarse, subangular blocky structure; firm; very strongly acid; clear, wavy boundary.

IICg—57 to 73 inches, light brownish-gray (2.5Y 6/2) silty clay; many, medium, distinct, brownish-yellow (10YR 6/8) mottles; weak, fine, subangular blocky structure; friable; black stains along cleavage lines; neutral; clear, wavy boundary.

The A horizon ranges from 3 to 15 inches in thickness. It is dark grayish brown, dark gray, light brownish gray, or gray and is very strongly acid or strongly acid. The B horizon is strongly acid or very strongly acid. The B2 horizon is grayish-brown, light-gray, or light brownish-gray clay or silty clay mottled with shades of yellow, brown, and red. The IIC horizon is light brownish-gray clayey and loamy material mottled with shades of yellow and brown. It is slightly acid or neutral.

Urbo soils are associated with Guyton, Nugent, and Rexor soils. They are finer textured than those soils. They are more poorly drained than Nugent and Rexor soils. Urbo soils contain less clay than the otherwise similar Alligator soils.

Ur—Urbo silty clay loam, frequently flooded. This soil is on alluvial plains of streams that drain the uplands. It is somewhat poorly drained. This soil has a loamy surface layer and a clayey subsoil. It has slopes of 0 to 1 percent.

Included with this soil in mapping are small areas of Guyton, Nugent, and Rexor soils.

This soil has low natural fertility. Runoff is slow, and water moves very slowly through the soils. A seasonal high water table is at a depth of 1 to 3 feet from December through April. Flooding, low strength, wetness, and the high shrink-swell potential of the clayey subsoil are the main limitations.

Most of the acreage is in pasture. A small acreage is wooded. This soil is not suited to crops and is poorly suited to pasture plants, because of the hazard of flooding. Common bermudagrass and Pensacola bahiagrass can be grown, but flooding severely restricts grazing time. Capability unit Vw–1; woodland suitability group 2w9.

Vaiden Series

The Vaiden series consists of somewhat poorly drained, very slowly permeable, clayey soils on uplands. These soils formed in alkaline clayey marine sediment.

In a representative profile the surface layer is very dark grayish brown silty clay about 3 inches thick. The subsoil extends to a depth of about 25 inches. It is yellowish-brown clay mottled with grayish brown. The underlying material is light olive-gray clay and silty clay.

Most of the acreage of these soils is wooded.

Representative profile of Vaiden silty clay in an area of Vaiden-Watsonia association, rolling, located southeast of Dough Hills, 45 feet northeast of road, NE¼ NW¼ sec. 17, T. 4 N., R. 4 W.:

A1—0 to 3 inches, very dark grayish-brown (10YR 3/2) silty clay; moderate, fine and medium, granular structure; sticky, plastic; medium acid; clear, wavy boundary.

B2—3 to 14 inches, yellowish-brown (10YR 5/4, 5/6) clay; moderate, fine, subangular blocky structure; sticky, plastic; strongly acid; gradual, wavy boundary.

B3—14 to 25 inches, yellowish-brown (10YR 5/6) clay; common, fine, faint, grayish-brown mottles; weak, fine and medium, subangular blocky structure; sticky, plastic; shiny faces on peds; medium acid; clear, wavy boundary.

C1—25 to 32 inches, light olive-gray (5YR 6/2) clay; massive; sticky, plastic; many slickensides that intersect; neutral; gradual, wavy boundary.

C2—32 to 75 inches, light olive-gray (5Y 6/2) silty clay; massive; firm; common slickensides that intersect; breaks into wedge-shaped fragments; many, coarse, soft accumulations of lime; mildly alkaline; slightly effervescent.

The A horizon is dark gray, very dark grayish brown, or grayish brown. It is strongly acid or medium acid. The B horizon is light olive brown or yellowish brown mottled with shades of gray, brown, and red. It is strongly acid or medium acid. The C horizon is gray or light olive gray. It is strongly acid to mildly alkaline and has few to many concretions of lime.

In this parish Vaiden soils are slightly shallower over alkaline material than is defined in the range for the Vaiden series. This difference does not alter their use, behavior, and management.

Vaiden soils are associated with Anacoco, Cadeville, Kisatchie, and Watsonia soils. They have a more alkaline B horizon than Anacoco and Kisatchie soils and do not have underlying siltstone and sandstone, which is typical of Anacoco and Kisatchie soils. Vaiden soils are more poorly drained than Cadeville, Kisatchie, and Watsonia soils.

VWD—Vaiden-Watsonia association, rolling. These are moderately sloping to moderately steep, somewhat poorly drained and well-drained, clayey soils on uplands. They have slopes of 5 to 20 percent.

The composition of this mapping unit is more variable than that of most other mapping units in the parish, but it has been controlled well enough so that interpretations can be made for expected use of the soils.

This mapping unit is made up of about 35 percent Vaiden soils and 33 percent Watsonia soils. The re-

maining 32 percent consists mostly of Cadeville, Anacoco, and Kisatchie soils and some soils that have a thick, dark-colored surface layer.

Included in mapping are small areas of soils that are severely eroded.

The Vaiden soil is somewhat poorly drained and has low natural fertility. It is on ridgetops and the upper part of side slopes. Runoff is rapid, and water moves very slowly through the soil. A seasonal water table is at a depth of 1 to 2 feet from December through April. Slope, the very high shrink-swell potential, and low strength are the main limitations.

The Watsonia soil is well drained and has low natural fertility. It is on side slopes. Runoff is rapid, and water moves very slowly through the soil. A seasonal high water table is below a depth of 6 feet. Slope, the very high shrink-swell potential, and low strength are the main limitations.

Most of the acreage is in poor-quality mixed pine and hardwoods. The soils in this association are not suited to cultivated crops and are poorly suited to pasture because of slope. Suitable pasture plants are common bermudagrass and Pensacola bahiagrass. Capability unit VIe–4; woodland suitability group—Vaiden soils 3c8, Watsonia soils 4c2c.

Watsonia Series

The Watsonia series consists of well-drained, very slowly permeable, clayey soils on uplands. These soils formed in calcareous clayey marine sediment. Watsonia soils are mapped only in an association with Vaiden soils.

In a representative profile the surface layer is very dark gray silty clay about 5 inches thick. The subsoil is calcareous, pale-olive and olive clay about 23 inches thick. The underlying material is calcareous light olive-gray clay.

Most of the acreage of these soils is wooded.

Representative profile of Watsonia silty clay in an area of Vaiden-Watsonia association, rolling, approximately 1.2 miles southeast of Dough Hill road junction, 60 feet northeast of road, NE¼NW¼ sec. 17, T. 4 N., R. 4 W.:

A1—0 to 5 inches, very dark gray (10YR 3/1) silty clay; moderate, medium, granular structure; firm; neutral; clear, wavy boundary.

B21—5 to 15 inches, pale-olive (5Y 6/3) clay; common, fine, faint, olive mottles; weak, coarse, prismatic structure parting to moderate, medium and fine, angular blocky; firm; thin, discontinuous coatings of grayish-brown on peds; very dark gray A1 material in root channels; neutral; gradual, wavy boundary.

B22—15 to 21 inches, olive (5Y 5/3) clay; moderate, medium, subangular blocky structure; firm; thin, patchy coatings of grayish-brown on peds; many, fine, dark-colored concretions; mildly alkaline; clear, wavy boundary.

B3—21 to 28 inches, olive (5Y 5/4) clay; moderate, medium, subangular blocky structure; firm; shiny faces on peds and few coarse slickensides; thin, patchy coatings of grayish-brown on peds; few, fine concretions of calcium carbonate at base of horizon; few, fine, dark concretions; moderately alkaline; abrupt, wavy boundary.

C—28 to 66 inches, light olive-gray (5Y 6/2) clay; massive; firm; many, fine to coarse concretions of calcium carbonate; moderately alkaline.

The A horizon ranges from 4 to 9 inches in thickness. It is very dark gray, dark grayish-brown, or olive-gray silty clay and is neutral or mildly alkaline. The B horizon is pale-olive, olive, or light olive-gray clay or silty clay. It is neutral to moderately alkaline. The C horizon is light olive gray or grayish brown and typically contains a small percentage of calcium carbonate concretions.

In this parish Watsonia soils have a thicker solum than is defined in the range for the Watsonia series. This difference does not alter use, behavior, and management.

Watsonia soils are associated with Anacoco, Cadeville, Kisatchie, and Vaiden soils. They are better drained and more alkaline than those soils.

Wrightsville Series

The Wrightsville series consists of poorly drained, very slowly permeable soils in depressions, mainly along drainageways on uplands. These soils have a thick, loamy subsurface layer and a clayey subsoil. They formed in clayey alluvial sediment.

In a representative profile the surface layer is grayish-brown silt loam about 2 inches thick. The subsurface layer is gray silt loam about 21 inches thick. The subsoil extends to a depth of 45 inches. It is gray and light brownish-gray silty clay mottled with yellowish-brown. The underlying material is strong-brown clay mottled with red and gray.

Most of the acreage of these soils is wooded. A small acreage is in pasture.

Representative profile of Wrightsville silt loam, on the west side of SE¼SW¼ sec. 3, T. 4 N., R. 2 E.:

A1—0 to 2 inches, grayish-brown (10YR 5/2) silt loam; weak, fine, granular structure; friable; very strongly acid; clear, smooth boundary.

A21g—2 to 13 inches, gray (10YR 6/1) silt loam; common, medium, faint, yellowish-brown (10YR 5/6) and dark yellowish-brown (10YR 4/4) mottles; weak, medium, subangular blocky structure; friable; common, fine, dark-brown concretions; many, fine pores; very strongly acid; gradual, wavy boundary.

A22g—13 to 23 inches, light-gray (10YR 7/1) silt loam; common, medium, faint, yellowish-brown (10YR 5/6) mottles; massive; firm; slightly brittle when dry; few, fine pores; tongues ½ inch to 1½ inches in diameter of light-gray silt extend to a depth of 32 inches; common, fine, dark-brown concretions; very strongly acid; abrupt, irregular boundary.

B21tg—23 to 32 inches, gray (10YR 6/1) silty clay; common, medium, faint, yellowish-brown (10YR 5/6) mottles; moderate, coarse, prismatic structure; firm; coatings of light-gray silt on some vertical peds; very strongly acid; clear, wavy boundary.

B3g—32 to 45 inches, light brownish-gray (10YR 6/2) silty clay; many, medium, faint, yellowish-brown (10YR 5/6) mottles; moderate, coarse, prismatic structure parting to moderate, medium, angular blocky; firm; common, fine concretions; strongly acid; abrupt, wavy boundary.

IIC1—45 to 75 inches, strong-brown (7.5YR 5/6) clay; few, medium, distinct, yellowish-red mottles and common, medium, distinct, light brownish-gray (2.5Y 6/2) mottles; massive; firm; common, fine, dark-brown concretions; few slickensides that do not intersect; mildly alkaline; abrupt, wavy boundary.

IIIC2—75 to 96 inches, yellowish-red (5YR 5/6) silty clay; massive; firm; common concretions of calcium carbonate; moderately alkaline.

The A horizon is very strongly acid or strongly acid. The A2 horizon is grayish brown, light brownish gray, gray, or light gray. The B horizon ranges from 13 to 36 inches in thickness. It is grayish brown, gray, or light brownish gray mottled with yellowish brown. It is very strongly acid or strongly acid. The C horizon is red, gray, grayish-brown, or brown clay or silty clay. It is neutral to moderately alkaline.

Wrightsville soils are associated with Acadia, Gore, and Kolin soils. They are more poorly drained than those soils. Wrightsville soils have a more clayey B horizon than the otherwise similar Guyton soils.

Wr—Wrightsville silt loam. This soil is in depressions along drainageways on uplands. It has loamy surface and subsurface layers and a clayey subsoil. This soil is poorly drained. It has slopes of 0 to 1 percent.

Included with this soil in mapping are small areas of Acadia and Guyton soils.

This soil has low natural fertility. Runoff is slow, and water moves very slowly through the soil. This soil is wet during much of winter and spring. A seasonal high water table is at a depth of 0 to 1½ feet from December through April. The soil dries out more slowly than most surrounding soils. Water stands in some areas for short periods following heavy rains. Plants are likely to be damaged by a lack of moisture during summer and fall. The surface layer is subject to piping when used as construction material. Wetness, the high shrink-swell potential of the clayey subsoil, and low strength are the main limitations.

Most of the acreage is wooded. A small acreage is in pasture. Suitable crops are rice, grain sorghum, soybeans, and sweet potatoes. Suitable pasture plants are common bermudagrass, Pensacola bahiagrass, and southern wild winter pea. The soil is difficult to keep in good tilth because of surface crusting. Proper management of crop residue and green-manure crops helps to improve tilth and to reduce surface crusting. A surface drainage system is needed if this soil is used for crops and pasture. Response of crops to fertilizer is fairly good. Lime is generally needed. Capability unit IIIw–7; woodland suitability group 3w9.

Use and Management of the Soils

This section describes the use and management of the soils in Rapides Parish. It discusses use of the soils for crops and pasture, woodland, wildlife, and engineering purposes.

Use of the Soils for Crops and Pasture

This section explains how soils in Rapides Parish can be managed for crops and pasture, describes the capability classification used by the Soil Conservation Service, and gives estimated yields per acre of the principal crops grown under a high level of management.

General principles of management

General principles of soil management widely applicable to Rapides Parish are discussed in the following paragraphs. Special recommendations cannot be given, because management practices change as new information becomes available. Assistance in detailed planning can be obtained from the local representative of the Soil Conservation Service or from representatives of the Extension Service of the Louisiana Agricultural Experiment Station.

Fertilizing and liming.—The soils of Rapides Parish range from extremely acid to moderately alkaline in reaction. Most cultivated soils are low in organic-matter content and available nitrogen. Latanier, Moreland, Norwood, and Roxana soils generally need only nitrogen fertilizer if they are used for nonleguminous crops. Most of these soils have a medium to high content of phosphorus, potassium, and calcium. The remaining soils in the parish that are cultivated generally need to be limed and fertilized with phosphorus, potassium, and nitrogen. Fertilizer and lime should be applied according to needs determined by soil tests.

Maintaining organic matter.—Most of the cultivated soils are low in organic-matter content. Organic matter is an important source of nitrogen, and it also helps to increase the rate of water intake and retention, reduce surface crusting, and improve tilth. The content of organic matter in the soil can be maintained by growing crops that produce an extensive root system and an abundance of foliage, by leaving plant residue on the soil, by growing perennial grasses and legumes in rotation with other crops, and by adding manure.

Soil tillage.—Soils should be tilled only enough to prepare a seedbed and to control weeds. Excessive tillage destroys soil structure. The clayey soils form clods when plowed. Compact layers or traffic pans form in some of the loamy soils if they are cultivated. Deep plowing or chiseling helps to break up this pan. The soils can be protected from beating rains by the use of tillage implements that stir the surface and leave crop residue on top. This residue helps to reduce surface crusting, retards runoff, increases water infiltration, and reduces erosion.

Drainage and flood control.—Most of the soils of the Red River alluvial plain in the parish need surface

drainage to make them suited to crops or to achieve maximum production. The soils are drained by gravity drainage systems consisting of a series of mains, laterals, and split ditches. In addition, a gravity drainage system consisting of row drains, row arrangement, and field drains is used. The success of these systems depends on the availability of outlets, and some parts of the parish lack adequate outlets. Another method used to improve drainage is land smoothing and grading. This practice consists of precision leveling to a uniform grade. Land grading improves surface drainage and eliminates cross ditches. Longer rows are possible, and efficiency of farm equipment is increased. The main manmade levee system along the Red River protects the Red River alluvial plain from flooding by the river; however, some areas at low elevations are flooded from local accumulations of rainfall.

Capability grouping

Some readers, particularly those who farm on a large scale, may find that the capability classification system used in this soil survey is a practical aid in both use and management of the different kinds of soil on their farms. The capability classification system is a useful grouping that shows, in a general way, the suitability of soils for most kinds of farming.

The grouping is based on permanent limitations of soils when used for field crops, the risk of damage when they are farmed, and the way the soils respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils. It also does not take into consideration possible but unlikely major reclamation projects, nor does it apply to rice, horticultural crops, or other crops that require special management.

Those familiar with the capability classification can infer from it much about the behavior of soils when used for other purposes, but this classification is not a substitute for interpretations designed to show suitability and limitations for range, for forest trees, or for engineering.

In the capability system, all kinds of soil are grouped at three levels: the class, the subclass, and the unit. The broadest grouping, the capability class, is designated by Roman numerals I to VIII. In class I are the soils that have the fewest limitations, the widest range of use, and the least risk of damage when they are used. The soils in the other classes have progressively greater natural limitations. In class VIII are soils and landforms so rough, shallow, or otherwise limited that they do not produce worthwhile yields of crops, forage, or wood products.

The subclass indicates major kinds of limitations within the classes. Within most of the classes there can be up to four subclasses. The subclasses are indicated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* means that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage) ; and *s* shows that the soil is limited mainly because it is shallow, droughty, or stony. Subclass *c* is not used in Rapides Parish.

In class I there are no subclasses, because the soils of this class have few or no limitations. Class V can contain, at the most, only subclasses *w, s,* and *c,* because the soils are subject to little or no erosion but have other limitations that confine their use largely to pasture, range, or wildlife habitat.

Subclasses are further divided into groups called capability units. These are groups of soils that are so much alike that they are suited to the same crops and pasture plants, require about the same management, and have generally similar productivity and other responses to management. Capability units are generally identified by numbers assigned locally, for example, IIe–1 or IIIe–4.

The capability classes, subclasses, and units in Rapides Parish are described in the list that follows. The unit designation for each soil in the parish is given in the "Guide to Mapping Units."

Class I. Soils that have few limitations that restrict their use.
- (No subclasses.)
  - Unit I–1. Nearly level, well-drained soils that have a silt loam surface layer underlain by stratified silt loam, very fine sandy loam, and silty clay loam material.
  - Unit I–2. Nearly level, well-drained soils that have a silt loam surface layer and a silt loam or silty clay loam subsoil.

Class II. Soils that have moderate limitations that reduce the choice of plants or require moderate conservation practices.
- Subclass IIe. Soils subject to moderate erosion unless protected.
  - Unit IIe–1. Gently undulating, well-drained, loamy soils.
  - Unit IIe–2. Gently undulating, moderately well drained, loamy soils.
  - Unit IIe–3. Gently sloping, well-drained, loamy soils.
- Subclass IIw. Soils moderately limited because of excess water.
  - Unit IIw–1. Nearly level, well-drained soils that have a silty clay loam surface layer and a silty clay loam or silt loam subsoil.
  - Unit IIw–2. Nearly level, well-drained soils that have a silty clay loam surface layer underlain by stratified silt loam, very fine sandy loam, and silty clay loam material.

Class III. Soils that have severe limitations that reduce the choice of plants or require special conservation practices, or both.
- Subclass IIIe. Soils subject to severe erosion if they are cultivated and not protected.
  - Unit IIIe–1. Gently sloping, somewhat poorly drained soils that have a loamy surface layer and a clayey subsoil.
  - Unit IIIe–2. Moderately sloping, moderately well drained, loamy soils.
  - Unit IIIe–3. Gently sloping, moderately well drained, loamy soils that have a fragipan.
  - Unit IIIe–4. Moderately sloping, well-drained soils that have a loamy surface layer and a clayey subsoil.
  - Unit IIIe–5. Moderately sloping, well-drained, loamy soils.

Subclass IIIw. Soils that are severely limited for cultivation because of excess water.
Unit IIIw–1. Nearly level, somewhat poorly drained soils that have a loamy surface layer and a clayey subsoil.
Unit IIIw–2. Nearly level, poorly drained, loamy soils.
Unit IIIw–3. Nearly level, somewhat poorly drained and moderately well drained soils that have a loamy surface layer and a clayey subsoil.
Unit IIIw–4. Nearly level, somewhat poorly drained and moderately well drained soils that have a silty clay loam surface layer.
Unit IIIw–5. Nearly level, somewhat poorly drained and moderately well drained soils that have a clayey surface layer.
Unit IIIw–6. Gently undulating, somewhat poorly drained, clayey soils.
Unit IIIw–7. Nearly level, poorly drained, loamy soils that have a loamy surface layer and a clayey subsoil.
Subclass IIIs. Soils that are severely limited for cultivation because of rapid permeability and low available water capacity.
Unit IIIs–1. Moderately sloping, somewhat excessively drained, sandy soils.
Unit IIIs–2. Moderately sloping, well-drained, loamy soils that have a sandy surface layer.

Class IV. Soils that have very severe limitations that reduce the choice of plants or require very careful management, or both.
Subclass IVe. Soils that are subject to very severe erosion if they are cultivated and not protected.
Unit IVe–1. Gently sloping, somewhat poorly drained and moderately well drained soils that have a loamy surface layer and a clayey subsoil.
Unit IVe–2. Gently sloping, well-drained, clayey soils that are calcareous.
Unit IVe–3. Strongly sloping, well-drained, loamy soils.
Subclass IVw–1. Soils that are severely limited for cultivation because of occasional flooding.
Unit IVw–1. Nearly level, somewhat poorly drained and poorly drained, loamy and clayey soils that are subject to occasional flooding.
Unit IVw–2. Gently undulating, well-drained, loamy soils that are subject to occasional flooding.

Class V. Soils that are subject to little or no erosion but have other limitations, impractical to remove, that limit their use largely to pasture, woodland, or wildlife habitat.
Subclass Vw. Soils that are too wet for cultivation because drainage and protection are not feasible.
Unit Vw–1. Nearly level, somewhat poorly drained and poorly drained, clayey soils that are subject to frequent flooding.
Unit Vw–2. Gently undulating, well-drained, loamy soils that are subject to frequent flooding.
Unit Vw–3. Nearly level, well-drained and excessively drained, loamy and sandy soils that are subject to frequent flooding.
Unit Vw–4. Nearly level, poorly drained soils that are subject to frequent flooding.

Class VI. Soils that have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife habitat.
Subclass VIe. Soils that are severely limited, chiefly by risk of erosion, unless protective cover is maintained.
Unit VIe–1. Moderately sloping and rolling, well-drained and poorly drained, loamy soils on uplands.
Unit VIe–2. Moderately sloping and rolling, well drained and moderately well drained soils on uplands; these soils have a loamy surface layer and a clayey subsoil.
Unit VIe–3. Rolling, excessively drained, sandy soils.
Unit VIe–4. Rolling, somewhat poorly drained and well-drained, clayey soils.

Predicted yields

Table 2 lists predicted yields of principal crops that can be grown in the parish. The predictions are based on information taken from research data and on estimates made by farmers, soil scientists, and others who have knowledge of yields in the parish. The predicted yields are average yields per acre that can be expected by good commercial farmers at the level of management that tends to produce the highest economic returns.

Crops other than those shown in table 2 can be grown in the parish, but their predicted yields are not included in the table, because the presently grown acreage is small or the acreage that may be grown in the future will probably be small.

The predicted yields given in table 2 can be expected if the following management practices are followed:

1. Rainfall is effectively used and conserved.
2. Surface drainage systems are installed.
3. Crop residue is managed to maintain soil tilth.
4. Minimum but timely tillage is used.
5. Insect, disease, and weed control measures are consistently used.
6. Fertilizer is applied according to soil test and crop needs.
7. Adapted crop varieties are used at recommended seeding rates.
8. Farming is done on the contour and terraces are constructed for erosion control.

Woodland [3]

Almost all of Rapides Parish was originally wooded, except for an area of less than 5,000 acres in the northeastern part of the parish, which is locally known as the Holloway Prairie. Although some acreage, mostly on the Red River alluvial plain, has been cleared

[3] H. F. FALLIN, woodland conservationist, Soil Conservation Service, assisted in the preparation of this section.

TABLE 2.—*Predicted average acre yields of principal crops and pasture plants under high-level management*

[Absence of yield figure indicates crop is not suited to the soil or is not commonly grown on the soil]

Series and mapping unit	Cotton	Rice	Corn	Soybeans	Grain sorghum	Sugarcane	Pasture plants	
							Common bermudagrass	Pensacola bahiagrass
	Lb of lint	*Bu*	*Bu*	*Bu*	*Bu*	*Tons*	*AUM*[1]	*AUM*[1]
Acadia:								
AcA				25	60		5.0	6.5
AcB				25	60		5.0	6.5
Alligator: AL							4.5	6.0
Anacoco: AnB				22	50		4.5	5.0
Aqualfs: AsC							4.0	
Beauregard: BeB			65	25	60		6.0	7.0
Caddo: Ca			60	20	55		5.5	6.5
Cadeville:								
CeC				22	50		5.0	6.0
CeE							4.0	5.0
Cahaba: ChB			75	30	65		7.0	8.5
Crowley: Cr		110		30	65		5.5	7.0
Eustis:								
EuC				20	50			5.5
EuE								4.5
Foley: Fo				20	50		3.5	
Gallion:								
Ga	875		85	40	85	32	7.5	9.5
Gn	800		75	40	85	32	7.5	9.0
Glenmora: GoB			55	25	65		5.5	6.5
Gore:								
GrC				20	50		4.5	6.0
GrD							4.0	5.5
Guyton:								
Gu		100		22	55		6.0	9.0
Gy							4.5	5.5
Kisatchie: KCE							3.5	4.0
For Cadeville part, see Cadeville series, CeE.								
Kolin: KnB			60	30	55		5.5	8.5
Latanier:								
La	750	130	80	40	90	32	7.0	9.0
Lc	700	130		40	90	32	6.5	9.0
Libuse: LsB			65	35	60		5.5	7.5
Lucy: LuC				35	50		5.0	7.5
Malbis: MaC			75	30	60		5.5	7.5
McKamie:								
McC				25	50		5.0	5.5

TABLE 2.—*Predicted average acre yields of principal crops and pasture plants under high-level management*—Continued

Series and mapping unit	Cotton	Rice	Corn	Soybeans	Grain sorghum	Sugarcane	Pasture plants	
							Common bermudagrass	Pensacola bahiagrass
	Lb of lint	*Bu*	*Bu*	*Bu*	*Bu*	*Tons*	*AUM*[1]	*AUM*[1]
McKamie—Continued								
McD							4.5	5.0
Moreland:								
MdA	625	130		37	90	30	6.0	9.0
MnA	625	130		37	90	30	6.0	9.0
MnB	575			30	90	30	6.0	9.0
MoA				30	90		5.5	8.0
MrA							5.5	8.0
Morse: MsC				25	50			5.5
Mowata: Mw		110		25	60		5.5	6.5
Norwood:								
Nd	875		90	40	90	35	7.5	9.5
Nw	775		85	40	90	35	7.5	9.0
Nugent							7.0	7.0
Paleudalfs: Pa				25	50		5.5	6.0
Perry: Pe							5.0	7.5
Rexor: Re							6.5	7.0
For Nugent part, see Nugent series.								
Roxana:								
RnB	725		80	35	75	32	8.5	9.5
Ro				30	75		7.5	9.5
Rr							6.0	8.5
Ruston:								
RsB			75	30	55		5.5	9.5
RsC			60	25	55		5.5	9.5
Smithdale:								
SmE				25	55		5.0	8.5
SmF							4.5	8.5
Urbo: Ur							4.5	5.5
Vaiden: VWD							4.0	5.5
Wrightsville: Wr		110		25	60		6.0	7.0

[1] Animal unit month expresses the carrying capacity of pasture. It is based on the amount of forage required to feed a 1,000-pound animal for 1 month (equivalent to 600 pounds of hay).

for crops and pasture, about 74 percent of the parish remains wooded. About 102,115 acres of the Kisatchie National Forest and 6,000 acres of the Alexander State Forest are in the parish.

Good stands of commercial trees are produced in the woodlands of the parish. Pine species generally grow best on uplands, and hardwood species generally grow best on the Red River alluvial plain and on the alluvial plains of streams that drain the uplands. Much of the Red River alluvial plain has been cleared and is in crops and pasture.

The value of the wood products in the parish is

substantial. Other values associated with woodlands include wildlife habitat, recreation, grazing of pine woodland, natural beauty, and conservation of soil and water. This section explains how the soils affect tree growth and woodland management.

The soils of Rapides Parish have been placed in woodland suitability groups to assist owners in planning the use of their soils for wood crops. Each group is made up of soils that are suited to the same kinds of trees, that need approximately the same kind of management when the vegetation on them is similar, and that have about the same potential productivity.

Each woodland group is identified by a three-part symbol, such as 1w5, 2c8, or 3r2. The first part of the symbol, always a number, indicates relative potential productivity of the soils in the group: 1 = very high; 2 = high; 3 = moderately high; 4 = moderate; and 5 = low. These ratings are based on field determinations of average site index. Site index is the height, in feet, that the dominant trees of a given species, on a specified kind of soil, reach in a natural, unmanaged stand in a stated number of years. For the marketable hardwoods and softwoods in this parish, the site index is the height reached in 50 years, except for cottonwood, for which the index is the height reached in 30 years.

The five foregoing ratings are based on field determinations of average site index of an indicator forest type or species. Site indexes are grouped into site quality classes, and the classes are used to arrive at approximate expected yields per acre in cords and board feet. On the basis of research studies, site index can be converted into approximate expected growth and yield per acre in cords and board feet.

The second part of the symbol identifying a woodland group is a small letter. This letter indicates an important soil property that imposes a slight to severe hazard or limitation in managing the soils of the group for wood crops. A letter *c* shows that the main limitation is the kind or amount of clay in the upper part of the soils in the group; *o* shows that the soils have few limitations that restrict their use for trees; *r* shows that the main limitation is steep slope; *s* shows that the soils are sandy and dry, have little or no difference in texture between surface layer and subsoil (or B horizon), have low available water capacity, and generally have a low supply of plant nutrients; *w* shows that water in or on the soil, either seasonally or year round, is the main limitation; *d* shows a restricted rooting depth; and *t* shows presence of toxic compounds.

The third part of the symbol indicates the degree of hazard or limitation and general suitability of the soils for certain kinds of trees.

The *numeral 1* indicates soils that have no or only slight limitations and that are best suited to needleleaf trees.

The *numeral 2* indicates soils that have one or more moderate limitations and are best suited to needleleaf trees. A lower case *c* following the numeral indicates soils best suited to cedar trees.

The *numeral 3* indicates soils that have one or more severe limitations and that are best suited to needleleaf trees.

The *numeral 4* indicates soils that have no or only slight limitations and are best suited to broadleaf trees.

The *numeral 5* indicates soils that have one or more moderate limitations and are best suited to broadleaf trees.

The *numeral 6* indicates soils that have one or more severe limitations and are best suited to broadleaf trees.

The *numeral 7* indicates soils that have no or only slight limitations and are suited to either needleleaf or broadleaf trees.

The *numeral 8* indicates soils that have one or more moderate limitations and are suited to either needleleaf or broadleaf trees.

The *numeral 9* indicates soils that have one or more severe limitations and are suited to either needleleaf or broadleaf trees.

The *numeral 0* indicates that the soils are not suitable for producing timber commercially.

Important parts of the description of each woodland group are the adjective ratings for hazard of erosion, limitation to use of equipment, and hazard of seedling mortality. These ratings are always slight, moderate, or severe. Explanations of these ratings are given in the following paragraphs.

Erosion hazard refers to the potential hazard of soil losses in well-managed woodland. The hazard is *slight* if expected soil losses are small, *moderate* if some soil losses are expected and care is needed during logging and construction to reduce soil losses, and *severe* if special methods of operation are necessary to prevent excessive soil losses. In Rapides Parish only the steep soils have a severe hazard of erosion.

Equipment limitations are rated on the basis of soil characteristics that restrict or prohibit the use of equipment commonly used in tending and harvesting trees. In Rapides Parish soil characteristics having the most limiting effect are drainage, depth to the water table, slope, and texture of the surface layer. *Slight* means there is no restriction in the kind of equipment or in the time of year it is used; *moderate* means that use of equipment is restricted for less than 3 months of the year; and *severe* means that special equipment is needed and its use is restricted for more than 3 months of the year.

Seedling mortality refers to the expected degree of mortality of planted seedlings as influenced by kinds of soil when plant competition is not a limiting factor. Considered in the ratings are depth to the water table, hazard of flooding, drainage, soil depth and structure, and degree of erosion. Normal rainfall, good planting stock, and proper planting are assumed. A rating of *slight* indicates an expected loss of less than 25 percent of the planted seedlings; *moderate,* a loss of 25 to 50 percent of the seedlings; and *severe,* a loss of more than 50 percent of the seedlings. Special preparation of the site is needed before planting for soils rated severe and for most soils rated moderate.

The Texas leaf-cutting ant (Towns ant) can be a problem on the well-drained loamy and sandy soils.

In table 3 the soils are placed in woodland suitability groups, limitations and hazards to management are rated, trees preferred for planting are listed, and potential productivity is given for specified trees.

Production of forage in woodland

The kind and amount of understory vegetation that can be produced on an area is related to the soils, climate, and amount of tree overstory. In many pine woodlands, cattle grazing can be a compatible secondary use. Grazing is not recommended on hardwood woodland. The grasses, legumes, forbs, and many of the woody browse species in the understory are grazable and may be used by cattle, if properly managed to supplement a woodland enterprise without damage to the wood crop. In fact, on most pine woodlands, grazing is beneficial to the woodland program in that it (1) reduces the accumulation of heavy "rough," thus reducing the hazard of wildfires, and (2) helps to suppress undesirable woody plants.

The success of a combined woodland and livestock program depends primarily on the degree and time of grazing of the forage plants. Intensity of grazing must be such that it will maintain adequate cover for soil protection and maintain or improve the quantity and quality of trees and forage vegetation.

Forage production varies according to the type of woodland and the amount of sunlight that reaches the understory vegetation during the growing season.

The soils within a woodland suitability group have the potential for producing about the same kind and amount of understory vegetation, vegetation that grows on these soils under trees. It is generally the most productive and most suitable vegetative community for the soils and will reproduce itself as long as the environment does not change.

Research has proven there is a close correlation between the total potential yield of grasses, legumes, and forbs in a woodland suitability group and the amount of sunlight reaching the ground at midday in the forest. Herbage production continues to decline as the forest canopy becomes denser.

One of the main objectives in good woodland grazing management is to keep the woodland forage in excellent or good condition. If this is done, water is conserved, yields are improved, and the soils are protected.

The principal forage species listed in each woodland suitability group in table 3 are those that should be present for the group. The forage production shown for each woodland suitability group is the production that can be expected in normal years when the woodland forage class is in good condition and the canopy class is medium or less.

Wildlife

Opportunities for hunting and fishing in Rapides Parish are good. Because of the kind of farming practices, and because the majority of the woodlands are in pine, this parish lacks the more desirable habitat for some game animals. The fishing habitat is being improved by the addition of permanent water areas such as Cotile, Indian Creek, and Kincaid reservoirs. Woodland game such as deer and squirrel is found throughout most of the parish, but the best habitat is in hardwood areas along drainageways on uplands and on the Red River alluvial plain. Intensive improvement of timber stands in uplands has downgraded this habitat for deer and squirrel. The highest population of deer is in the Bayou Boeuf area. The rest of the parish has a medium to low population. Squirrels, which are dependent on mast crops, fluctuate in population.

Adequate farm game habitat is not too common in Rapides Parish because of the clean tillage employed in cotton and soybean production. The population of quail and rabbit is low to medium in most of the parish. The dove population of this parish fluctuates, and most of the shooting usually occurs during the first part of the hunting season.

Soils directly influence the kind and amount of vegetation and the amount of water available, and in this way they indirectly influence the kind of wildlife that can live in an area. Soil properties that affect the growth of wildlife habitat are (1) thickness of soil useful to crops, (2) surface texture, (3) available water capacity, (4) wetness, (5) flood hazard, (6) slope, and (7) permeability of the soil to air and water.

In table 4 the soils of this survey area are rated according to their suitability for producing seven elements of wildlife habitat and three groups or kinds of wildlife. The ratings are good, fair, poor, and very poor.

A rating of *good* indicates that habitat is easily improved, maintained, or created. There are few or no soil limitations in habitat management, and satisfactory results can be expected.

A rating of *fair* indicates that habitat can be improved, maintained, or created on these soils, but that moderate soil limitations affect habitat management or development. A moderate intensity of management and fairly frequent attention may be required to insure satisfactory results.

A rating of *poor* indicates that habitat can be improved, maintained, or created on these soils, but that the soil limitations are severe. Habitat management may be difficult and expensive and require intensive efforts. Results are questionable.

A rating of *very poor* indicates that under the prevailing soil conditions it is impractical to attempt to improve, maintain, or create habitat. Unsatisfactory results are probable.

The ratings in table 4 take into account primarily the characteristics of the soils and closely related natural factors of the environment. They do not reflect the factors of climate, present use of soils, or present distribution of wildlife and people. For this reason, selection of a site for development as a habitat for wildlife requires inspection at the site.

The elements of wildlife habitat rated in table 4 are briefly described in the following paragraphs.

Grain and seed crops.—These crops are annual grain-producing plants such as corn, sorghums, millet, and soybeans.

Domestic grasses and legumes.—This group consists of domestic grasses and legumes that are established by planting. They provide food and cover for wildlife. Grasses include bahiagrass, ryegrass, and panicgrass; legumes include annual lespedeza, shrub lespedeza, and clover.

Wild herbaceous plants.—This group consists of native or introduced perennial grasses, forbs, and weeds that provide food and cover for wildlife: beggarweed, perennial lespedeza, wild bean, pokeweed, and panicgrass.

TABLE 3.—*Suitability of the soils for*

[Dashes in lieu of entry indicate

Soil series and map symbols	Woodland group	Limitations and hazards to management			Trees preferred for planting
		Erosion hazard	Equipment limitations	Seedling mortality	
Acadia: AcA, AcB	2w8	Slight	Moderate	Slight	Loblolly pine, slash pine
Alligator: AL	3w6	Slight	Severe	Severe	Eastern cottonwood, sweetgum, American sycamore.
Anacoco: AnB	4c2	Slight	Moderate	Moderate	Loblolly pine, slash pine
Aqualfs: AsC	2w9	Slight	Severe	Severe	Loblolly pine, slash pine, American sycamore.
Beauregard: BeB	2w8	Slight	Moderate	Slight	Loblolly pine, slash pine
Caddo: Ca	2w9	Slight	Severe	Moderate	Loblolly pine, slash pine
Cadeville: CeC, CeE	3c2	Slight	Severe	Moderate	Loblolly pine, slash pine
Cahaba: ChB	2o7	Slight	Slight	Slight	Loblolly pine, slash pine
Crowley: Cr	2w9	Slight	Severe	Moderate	Loblolly pine, slash pine
Eustis: EuC, EuE	3s2	Slight	Moderate	Moderate	Longleaf pine, slash pine, loblolly pine
Foley: Fo	3w9	Slight	Severe	Moderate	Loblolly pine, sweetgum, American sycamore.
Gallion: Ga, Gn	2o4	Slight	Slight	Slight	American sycamore, eastern cottonwood

wood crops and woodland forage

site index information not available]

Potential productivity for trees		Understory plants used for forage	
Important species	Site index	Principal plants	Estimated yield for medium canopy of air-dry forage per acre
			Pounds
Loblolly pine	85	Pinehill bluestem	800
Shortleaf pine	75	Switchgrass	200
Sweetgum	85	Low panicum	200
Water oak	80	Sedges and rushes	300
		Other	300
Green ash	70	Grazing not recommended.	
Eastern cottonwood	90		
Sweetgum	80		
Loblolly pine	70	Pinehill bluestem	1,000
Shortleaf pine	----------	Longleaf uniola	150
		Low panicum	250
		Pineland three-awn	150
		Other	250
Loblolly pine	90	Not determined.	
Sweetgum	90		
Water oak	----------		
Southern red oak	----------		
Loblolly pine	90	Pinehill bluestem	800
Slash pine	----------	Switchgrass	200
Longleaf pine	----------	Low panicum	200
Sweetgum	----------	Other	600
Loblolly pine	90	Pinehill bluestem	800
Shortleaf pine	----------	Switchgrass	200
Sweetgum	95	Low panicum	200
Water oak	90	Other	600
Loblolly pine	80	Pinehill and little bluestem	1,000
Shortleaf pine	70	Low panicum	250
		Pineland three-awn	150
		Other	400
Loblolly pine	90	Pinehill and little bluestem	200
Sweetgum	90	Longleaf uniola	350
Cherrybark oak	90	Beaked panicum	150
		Other	500
Loblolly pine	90	Not determined.	
Sweetgum	----------		
Slash pine	----------		
Loblolly pine	85	Pinehill bluestem	400
Slash pine	80	Low panicum	200
Shortleaf pine	70	Longleaf uniola	150
Longleaf pine	70	Pineland three-awn	150
		Other	100
Loblolly pine	60	Not determined.	
Sweetgum	80		
Cherrybark oak	80		
Water oak	80		
Green ash	80	Grazing not recommended.	
Cherrybark oak	95		
Sweetgum	----------		
Water oak	----------		
Pecan	----------		
American sycamore	----------		
Eastern cottonwood	100		

TABLE 3.—*Suitability of the soils for*

Soil series and map symbols	Woodland group	Limitations and hazards to management			Trees preferred for planting
		Erosion hazard	Equipment limitations	Seedling mortality	
Glenmora: GoB	2w8	Slight	Moderate	Slight	Loblolly pine, slash pine
Gore: GrC, GrD	3c2	Slight	Moderate	Moderate	Loblolly pine, slash pine
Guyton: Gu, Gy	2w9	Slight	Severe	Moderate	Loblolly pine, sweetgum, slash pine
Kisatchie: KCE For Cadeville part, see Cadeville series.	5d3	Moderate to severe.	Moderate	Moderate	Loblolly pine, longleaf pine
Kolin: KnB	3w8	Slight	Moderate	Slight	Loblolly pine, slash pine
Latanier: La, Lc	2w5	Slight	Moderate	Moderate	Eastern cottonwood, sweetgum, American sycamore.
Libuse: LsB	2o1	Slight	Slight	Slight	Loblolly pine, slash pine
Lucy: LuC	3s2	Slight	Moderate	Moderate	Loblolly pine, longleaf pine, slash pine
Malbis: MaC	2o1	Slight	Slight	Slight	Loblolly pine, slash pine, longleaf pine
McKamie: McC, McD	3c2	Slight	Moderate	Moderate	Loblolly pine, slash pine

wood crops and woodland forage—Continued

Potential productivity for trees		Understory plants used for forage	
Important species	Site index	Principal plants	Estimated yield for medium canopy of air-dry forage per acre
			Pounds
Loblolly pine	95	Pinehill bluestem	800
Slash pine		Sedges and rushes	300
Longleaf pine		Switchgrass	200
		Low panicum	200
		Other	300
Loblolly pine	75	Pinehill and little bluestem	1,000
Longleaf pine		Low panicum	250
Shortleaf pine		Longleaf uniola	150
		Pineland three-awn	150
		Other	250
Loblolly pine	90	Pinehill bluestem	800
Sweetgum		Sedges and rushes	200
Green ash		Chalky bluestem	100
Eastern cottonwood		Silver plumegrass	100
Water oak		Other	600
Red oak			
Slash pine			
Loblolly pine	65	Pinehill and little bluestem	900
Slash pine	65	Longleaf uniola	150
Longleaf pine	55	Low panicum	150
Shortleaf pine	55	Pineland three-awn	150
		Other	250
Loblolly pine	85	Pinehill bluestem	800
Longleaf pine		Roundseed panicum	300
Slash pine		Switchgrass	200
Sweetgum		Other	500
Green ash	80	Grazing not recommended.	
Cherrybark oak	90		
Water oak	90		
Pecan			
Sweetgum	90		
American sycamore			
Eastern cottonwood	110		
Loblolly pine	90	Switchgrass	200
Longleaf pine	75	Little bluestem	400
Slash pine		Pinehill bluestem	400
Sweetgum	80	Longleaf uniola	200
		Beaked panicum	150
		Low panicum	150
		Other	500
Loblolly pine	85	Pinehill and little bluestem	400
Shortleaf pine		Low panicum	200
Slash pine		Pineland three-awn	150
Longleaf pine	70	Other	450
Loblolly pine	90	Pinehill and little bluestem	200
Slash pine	90	Longleaf uniola	350
Longleaf pine	80	Low panicum	300
		Other	150
Loblolly pine	85	Pinehill bluestem	1,000
Slash pine		Low panicum	250
Longleaf pine	85	Longleaf uniola	150
		Pineland three-awn	150
		Other	250

TABLE 3.—*Suitability of the soils for*

Soil series and map symbols	Woodland group	Limitations and hazards to management			Trees preferred for planting
		Erosion hazard	Equipment limitations	Seedling mortality	
Moreland: MdA, MnA, MnB	2w6	Slight	Severe	Moderate	Eastern cottonwood, sweetgum, American sycamore.
MoA, MrA	3w6	Slight	Severe	Severe	Eastern cottonwood, sweetgum, American sycamore.
Morse: MsC	5t0	Moderate	Severe	Severe	Planting questionable because of management and yield potential.
Mowata: Mw	2w9	Slight	Severe	Moderate	Loblolly pine, slash pine
Norwood: Nd, Nw	1o4	Slight	Slight	Slight	Eastern cottonwood, sweetgum, American sycamore.
Nugent Mapped only in complex with Rexor soils.	1o7	Slight	Slight	Slight	Sweetgum, yellow-poplar, loblolly pine, slash pine.
Paleudalfs: Pa	3w8	Slight	Severe	Slight	Loblolly pine, slash pine
Perry: Pe	3w6	Slight	Severe	Severe	Eastern cottonwood, sweetgum, American sycamore.
Rexor: Re For Nugent part, see Nugent series.	1o7	Slight	Slight	Slight	Loblolly pine, sweetgum, eastern cottonwood, yellow-poplar.
Roxana: RnB, Ro, Rr	1o4	Slight	Slight	Slight	Eastern cottonwood, American sycamore
Ruston: RsB, RsC	2o1	Slight	Slight	Slight	Loblolly pine, slash pine, longleaf pine
Smithdale: SmE, SmF	2o1	Slight	Slight	Slight	Loblolly pine, slash pine, longleaf pine

wood crops and woodland forage—Continued

Potential productivity for trees		Understory plants used for forage	
Important species	Site index	Principal plants	Estimated yield for medium canopy of air-dry forage per acre
			Pounds
Green ash	75	Grazing not recommended.	
Eastern cottonwood	100		
Sweetgum	90		
Water oak	90		
Cherrybark oak	90		
Pecan			
American sycamore			
Green ash	70	Grazing not recommended.	
Eastern cottonwood	90		
Sweetgum	80		
Water oak	80		
Pecan			
Cherrybark oak	80		
Loblolly pine	65	Not determined.	
Eastern redcedar	60		
Loblolly pine	85	Not determined.	
Slash pine			
Eastern cottonwood	110	Grazing not recommended.	
Green ash	90		
Sweetgum	100		
American sycamore			
Slippery elm			
Silver maple			
Pecan			
Water oak	95	Not determined.	
Willow oak	85		
Sweetgum	95		
Loblolly pine	100		
Slash pine	100		
Loblolly pine	90	Not determined.	
Sweetgum		Grazing not recommended.	
Green ash	70		
Eastern cottonwood	85		
Water oak			
Pecan			
American sycamore			
Loblolly pine	100	Grazing not recommended.	
Sweetgum			
Eastern cottonwood			
Water oak			
Eastern cottonwood	115	Grazing not recommended.	
Pecan			
Sweetgum	100		
American sycamore			
Water oak			
Cherrybark oak			
Loblolly pine	90	Longleaf uniola	350
Slash pine	90	Pinehill bluestem	200
Longleaf pine		Beaked panicum	150
		Low panicum	150
		Other	350
Loblolly pine	85	Longleaf uniola	350
Slash pine	85	Pinehill bluestem	200
Longleaf pine	70	Beaked panicum	150
		Low panicum	150
		Other	350

TABLE 3.—*Suitability of the soils for*

Soil series and map symbols	Woodland group	Limitations and hazards to management			Trees preferred for planting
		Erosion hazard	Equipment limitations	Seedling mortality	
Urbo: Ur	2w9	Slight	Severe	Severe	Loblolly pine, slash pine, sweetgum
Vaiden: VWD For Watsonia part, see Watsonia series.	3c8	Slight	Moderate	Moderate	Loblolly pine, eastern redcedar
Watsonia Mapped only in association with Vaiden soils.	4c2c	Moderate	Moderate	Moderate	Eastern redcedar
Wrightsville: Wr	3w9	Slight	Severe	Moderate to severe.	Loblolly pine, slash pine

Hardwood trees and shrubs.—These plants are nonconiferous trees and shrubs that produce wildlife food in the form of fruit, nuts, buds, catkins, or browse. Such plants commonly grow in their natural environment, but they can be planted and developed through wildlife management programs. Typical species in this category are oak, hickory, beech, cherry, dogwood, maple, viburnum, grape, honeysuckle, greenbrier, and blackgum.

Coniferous plants.—These plants are cone-bearing trees and shrubs that provide cover and frequently furnish good forage in the form of browse, seeds, or fruitlike cones. They commonly grow in their natural environment, but they can be planted and managed. Typical plants in this category are pines, cedars, and ornamental trees and shrubs.

Wetland food and cover.—In this group are annual and perennial herbaceous plants that grow wild on moist and wet sites. They furnish food and cover mostly for wetland wildlife. Typical examples of plants are smartweed, wild millet, spikerush, and other rushes, sedges, and grasses. Submerged and floating aquatics are not included in this category.

Shallow-water areas.—These developments are impoundments or excavations for controlling water, generally not more than 3 feet deep, to create habitats that are suitable for waterfowl or crayfish. Some are designed to be drained, planted, and then flooded; others are permanent impoundments that grow submersed aquatics.

The kinds of wildlife rated in table 4 are briefly described in the following paragraphs. These ratings are related to those made for the elements of wildlife habitat. For example, soils rated as very poor for shallow water developments are rated very poor for wetland wildlife.

Openland wildlife consists of birds and mammals that generally live in meadows, pastures, and open areas where grasses, herbs, and shrubby plants grow. Quail, doves, meadowlark, field sparrows, cottontail rabbit, and fox are typical openland wildlife.

Woodland wildlife consists of birds and mammals that generally live in wooded areas of hardwood trees, coniferous trees, and shrubs. Woodcock, thrushes, wild turkey, vireos, deer, swamp rabbit, squirrel, and raccoon are typical woodland wildlife.

Wetland wildlife consists of birds and mammals that generally live in wet areas, marshes, and swamps. Duck, geese, rail, shore birds, heron, mink, nutria, and muskrat are typical wetland wildlife.

Engineering Uses of the Soils [4]

This section is useful to those who need information about soils used as structural material or as foundation upon which structures are built. Among those who can benefit from this section are planning commissions, town and city managers, land developers, engineers, contractors, and farmers.

Among properties of soils highly important in engineering are permeability, strength, compaction characteristics, soil drainage condition, shrink-swell

[4] THOMAS D. PRESTRIDGE, area engineer, Soil Conservation Service, helped to prepare this section.

wood crops and woodland forage—Continued

Potential productivity for trees		Understory plants used for forage	
Important species	Site index	Principal plants	Estimated yield for medium canopy of air-dry forage per acre
			Pounds
Cherrybark oak	80–90	Grazing not recommended.	
Nuttall oak	70		
Southern red oak			
Water oak	80		
Willow oak	70		
Loblolly pine	90		
Slash pine	90		
Sweetgum	80–90		
Loblolly pine	75	Not determined.	
Shortleaf pine	70		
Eastern redcedar	45		
Eastern redcedar	40	Not determined.	
Loblolly pine	80	Plumegrass	100
Sweetgum	80	Pinehill and little bluestem	800
Water oak	80	Chalky bluestem	100
Slash pine		Florida paspalum	100
		Other	700

potential, grain size, plasticity, and soil reaction. Also important are depth to the water table, depth to bedrock, and soil slope. These properties, in various degrees and combinations, affect construction and maintenance of roads, airports, pipelines, foundations for small buildings, irrigation systems, ponds and small dams, and systems for disposal of sewage and refuse.

Information in this section of the soil survey can be helpful to those who—

1. Select potential residential, industrial, commercial, and recreational areas.
2. Evaluate alternate routes for roads, highways, pipelines, and underground cables.
3. Seek sources of gravel, sand, or clay.
4. Plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for controlling water and conserving soil.
5. Correlate performance of structures already built with properties of the kinds of soil on which they are built, for the purpose of predicting performance of structures on the same or similar kinds of soil in other locations.
6. Predict the trafficability of soils for cross-country movement of vehicles and construction equipment.
7. Develop preliminary estimates pertinent to construction in a particular area.

Most of the information in this section is presented in tables 5 and 6, which show, respectively, several estimates of soil properties significant to engineering and interpretations for various engineering uses.

This information, along with the soil map and other parts of this publication, can be used to make interpretations in addition to those given in tables 5 and 6, and it also can be used to make other useful maps.

This information, however, does not eliminate need for further investigations at sites selected for engineering works, especially works that involve heavy loads or that require excavations to depths greater than those shown in the tables, generally depths of more than 6 feet. Also, inspection of sites, especially small ones, is needed because many delineated areas of a given soil mapping unit may contain small areas of other kinds of soil that have strongly contrasting properties and different suitabilities or limitations for soil engineering.

Some of the terms used in this soil survey have a different meaning in soil science than in engineering. The Glossary defines many of these terms as they are commonly used in soil science.

Engineering soil classification systems

The two systems most commonly used in classifying samples of soils for engineering are the Unified system (*2*) used by SCS engineers, the Department of Defense, and others, and the AASHTO system (*1*) adopted by the American Association of State Highway and Transportation Officials.

In the Unified system soils are classified according to particle-size distribution, plasticity, liquid limit, and organic-matter content. Soils are grouped in 15 classes. There are eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL,

TABLE 4.—*Suitability of the soils for elements of wildlife habitat and kinds of wildlife*

Soil series and map symbols	Elements of wildlife habitat							Kinds of wildlife		
	Grain and seed crops	Domestic grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow-water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Acadia:										
AcA	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
AcB	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Alligator: AL	Poor	Fair	Fair	Fair		Fair	Fair	Fair	Fair	Fair.
Anacoco: AnB	Fair	Fair	Good		Fair	Very poor	Very poor	Fair	Fair	Very poor.
Aqualfs: AsC. Too variable to rate.										
Beauregard: BeB	Good	Good	Good		Good	Poor	Poor	Good	Good	Poor.
Caddo: Ca	Poor	Fair	Fair		Fair	Good	Good	Fair	Fair	Good.
Cadeville:										
CeC	Fair	Good	Good		Good	Poor	Very poor	Good	Good	Very poor.
CeE	Poor	Fair	Good		Good	Very poor	Very poor	Poor	Good	Very poor.
Cahaba: ChB	Good	Good	Good	Good		Poor	Very poor	Good	Good	Very poor.
Crowley: Cr	Fair	Fair	Fair	Fair		Good	Good	Fair	Fair	Good.
Eustis:										
EuC	Poor	Fair	Fair		Fair	Very poor	Very poor	Poor	Fair	Very poor.
EuE	Poor	Fair	Fair		Fair	Very poor	Very poor	Poor	Fair	Very poor.
Foley: Fo	Very poor	Very poor	Poor	Fair		Good	Good	Very poor	Poor	Good.
Gallion:										
Ga	Good	Good	Good	Good		Poor	Very poor	Good	Good	Very poor.
Gn	Good	Good	Good	Good		Poor	Very poor	Good	Good	Very poor.
Glenmora: GoB	Good	Good	Good		Good	Poor	Poor	Good	Good	Poor.
Gore:										
GrC	Fair	Good	Good		Fair	Poor	Poor	Good	Fair	Poor.
GrD	Poor	Good	Good		Fair	Very poor	Very poor	Fair	Fair	Very poor.
Guyton:										
Gu	Fair	Fair	Fair	Fair		Good	Good	Fair	Fair	Good.
Gy	Poor	Fair	Fair	Fair		Good	Good	Poor	Fair	Good.
Kisatchie: KCE For Cadeville part, see Cadeville series, CeE.	Very poor	Poor	Fair		Fair	Very poor	Very poor	Poor	Fair	Very poor.
Kolin: KnB	Good	Good	Good		Good	Poor	Poor	Good	Good	Poor.
Latanier:										
La	Fair	Good	Good	Good		Good	Good	Good	Good	Good.
Lc	Fair	Fair	Fair	Good		Good	Good	Fair	Good	Good.

Libuse: LsB	Good	Good	Good		Good	Poor	Poor	Good	Good	Poor.
Lucy: LuC	Fair	Fair	Good		Good	Poor	Very poor	Fair	Good	Very poor.
Malbis: MaC	Good	Good	Good		Good	Poor	Very poor	Good	Good	Very poor.
McKamie:										
McC	Fair	Good	Good		Fair	Poor	Poor	Good	Fair	Poor.
McD	Fair	Good	Good		Fair	Very poor	Very poor	Good	Fair	Very poor.
Moreland:										
MdA	Fair	Fair	Fair	Good		Good	Good	Fair	Good	Good.
MnA	Fair	Fair	Fair	Good		Good	Good	Fair	Good	Good.
MnB	Fair	Fair	Fair	Good		Good	Fair	Fair	Good	Fair.
MoA	Fair	Fair	Fair	Good		Good	Good	Fair	Good	Good.
MrA	Poor	Fair	Fair	Good		Good	Good	Poor	Good	Good.
Morse: MsC	Fair	Fair	Fair	Fair		Poor	Poor	Fair	Fair	Poor.
Mowata: Mw	Poor	Fair	Good	Fair		Good	Good	Fair	Fair	Good.
Norwood:										
Nd	Good	Good	Good	Good		Poor	Very poor	Good	Good	Very poor.
Nw	Good	Good	Good	Good		Poor	Very poor	Good	Good	Very poor.
Nugent	Poor	Fair	Fair	Good		Poor	Very poor	Fair	Good	Very poor.
Paleudalfs: Pa	Fair	Fair	Fair	Fair		Good	Good	Fair	Fair	Good.
Perry: Pe	Poor	Fair	Fair	Fair		Fair	Fair	Poor	Fair	Fair.
Rexor: Re For Nugent part, see Nugent series.	Poor	Fair	Fair	Good		Poor	Poor	Fair	Good	Poor.
Roxana:										
RnB	Good	Good	Good	Good		Poor	Very poor	Good	Good	Very poor.
Ro	Good	Good	Good	Good		Poor	Very poor	Good	Good	Very poor.
Rr	Poor	Fair	Fair	Good		Poor	Very poor	Fair	Good	Very poor.
Ruston:										
RsB	Good	Good	Good		Good	Poor	Very poor	Good	Good	Very poor.
RsC	Fair	Good	Good		Good	Very poor	Very poor	Good	Good	Very poor.
Smithdale:										
SmE	Fair	Good	Good		Good	Very poor	Very poor	Good	Good	Very poor.
SmF	Poor	Fair	Good		Good	Very poor	Very poor	Fair	Good	Very poor.
Urbo: Ur	Poor	Fair	Fair	Good		Fair	Good	Poor	Good	Fair.
Vaiden: VWD For Watsonia part, see Watsonia series.	Fair	Fair	Fair		Fair	Poor	Very poor	Fair	Fair	Very poor.
Watsonia	Fair	Fair	Fair		Fair	Very poor	Very poor	Fair	Fair	Very poor.
Wrightsville: Wr	Fair	Fair	Fair	Fair		Good	Good	Fair	Fair	Good.

TABLE 5.—*Estimated soil properties*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. fully the instructions for referring to other series that appear in the first

Soil series and map symbols	Depth from surface	USDA texture	Classification		Percentage passing sieve—			
			Unified	AASHTO	No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)
	In							
Acadia: AcA, AcB.	0–6	Silt loam	ML, CL–ML	A–4	100	100	95–100	85–100
	6–16	Silt loam or silty clay loam.	CL	A–6	100	100	95–100	85–100
	16–44	Silty clay or clay	CH, CL	A–7–6	100	100	95–100	90–100
	44–72	Silty clay or clay	CH, CL	A–7–6, A–6	100	100	85–100	90–100
Alligator: AL.	0–50	Clay	CH	A–7–6	100	100	100	95–100
	50–65	Sandy clay loam, silty clay, clay, fine sandy loam.	SM, SC, CL, CH	A–4, A–6, A–7–6	100	100	85–100	40–100
Anacoco: AnB.	0–11	Silt loam	ML, CL–ML	A–4	100	100	80–100	75–95
	11–46	Silty clay, clay	CH	A–7–6	100	100	90–100	80–100
	46–96	Silty clay loam (rock fragments in places).	CL, CH, SC, GC	A–7–6, A–6	60–100	50–100	50–100	45–95
Aqualfs: AsC.	0–32	Loamy sand	SM	A–2–4	100	100	50–75	15–30
	32–46	Sandy clay loam	SC	A–4, A–6	100	100	80–90	35–50
	46–64	Sandy clay	CL, SC	A–7–6, A–6	100	100	85–95	45–60
Beauregard: BeB.	0–8	Silt loam	ML	A–4	100	100	90–100	70–95
	8–35	Silt loam, silty clay loam.	CL, CL–ML	A–6, A–4	100	100	95–100	75–95
	35–75	Silt loam, silty clay loam.	CL	A–6	100	100	85–100	75–95
Caddo: Ca.	0–28	Silt loam	ML, CL–ML	A–4	100	100	95–100	70–95
	28–68	Silty clay loam	CL	A–6	100	100	85–100	50–90
Cadeville: CeC, CeE.	0–12	Very fine sandy loam.	ML, CL–ML	A–4	100	100	95–100	55–65
	12–43	Silty clay, clay	CH, CL	A–7–6	100	100	95–100	80–95
	43–56	Sandy clay loam	SC, CL	A–6	100	95–100	85–95	40–55
	56–65	Very fine sandy loam.	ML, CL–ML	A–4	100	100	95–100	55–65
Cahaba: ChB.	0–22	Fine sandy loam	SM	A–4	100	95–100	80–90	35–45
	22–41	Sandy clay loam, clay loam.	SC, CL	A–4, A–6	100	95–100	85–95	40–55
	41–53	Fine sandy loam	SM	A–4	100	95–100	75–85	35–50
	53–74	Loamy sand, sandy loam.	SM, SM–SP	A–4, A–2–4	100	90–100	50–75	10–45
Crowley: Cr.	0–20	Silt loam	ML, CL, CL–ML	A–4	100	100	95–100	75–100
	20–49	Silty clay loam, silty clay.	CH, CL	A–7–6	100	100	95–100	85–100
	49–96	Silty clay	CL, CH	A–7–6	100	100	95–100	85–100
Eustis: EuC, EuE.	0–26	Loamy fine sand	SM, SP–SM	A–2–4, A–3	100	100	50–85	5–20
	26–75	Loamy fine sand	SM	A–2–4	100	100	65–90	15–25
Foley: Fo.	0–25	Silt loam	CL–ML, CL	A–4, A–6	100	100	95–100	85–100
	25–72	Silty clay loam	CL	A–7–6	100	100	95–100	90–100
Gallion: Ga, Gn.	0–14	Silt loam, silty clay loam.	ML, CL–ML, CL	A–4, A–6	100	100	100	90–100
	14–54	Silt loam, silty clay loam.	CL	A–6	100	100	100	90–100
	54–70	Silt loam, very fine sandy loam, silty clay loam.	CL, CL–ML	A–4, A–6	100	100	100	90–100

significant in engineering

The soils in such mapping units may have different properties and limitations, and for this reason it is necessary to follow care-
column of this table. The symbol < means less than; the symbol > means more than]

Liquid limit	Plasticity index	Reaction	Permeability	Available water capacity	Shrink-swell potential	Corrosivity to uncoated steel	Wetness hazard	Flooding hazard
Pct		*pH*	*In per hr*	*In per in of soil*				
<30	[1] NP–7	4.5–6.0	0.6–2.0	0.16–0.23	Low	High	Moderate	None or slight for AcA.
25–40	11–18	4.5–5.5	0.6–2.0	0.16–0.22	Low	High.		
41–70	20–45	4.5–5.5	<0.06	0.15–0.18	High	High.		None for AcB.
35–60	15–38	4.5–7.3	0.06–0.2	0.15–0.20	Moderate	High.		
60–85	33–55	4.5–5.5	<0.06	0.14–0.18	Very high	High	Severe	Severe.
25–85	5–55	4.5–6.5	<0.2	0.14–0.18	Low to very high.	High.		
<25	NP–7	4.5–6.0	0.6–2.0	0.18–0.22	Low	Moderate	Slight	None.
51–70	25–40	4.5–5.5	<0.06	0.17–0.19	High	High.		
32–60	12–33	4.5–5.5	<0.2	0.08–0.20	Moderate to high.	High.		
	NP	5.6–6.5	2.0–6.0	0.05–0.09	Low	High	Severe	None or slight.
25–40	8–15	4.5–6.5	0.06–0.2	0.12–0.18	Low	High.		
32–45	12–20	4.5–6.5	0.06–0.2	0.13–0.16	Moderate	High.		
<23	NP–3	4.5–6.5	0.6–2.0	0.20–0.22	Low	Moderate	Slight	None.
25–35	7–15	4.5–6.0	0.2–0.6	0.20–0.22	Low	High.		
30–40	12–19	4.5–6.0	0.06–0.2	0.20–0.22	Low	High.		
<27	NP–7	4.5–6.0	0.6–2.0	0.18–0.23	Low	High	Severe	None or slight.
30–40	11–18	4.5–5.5	0.06–0.2	0.20–0.22	Low	High.		
<28	NP–7	5.1–5.5	0.6–2.0	0.14–0.22	Low	Moderate	Slight	None.
41–60	22–35	4.0–6.0	<0.06	0.18–0.20	High	High.		
30–40	12–18	4.0–5.0	0.6–2.0	0.15–0.20	Moderate	Moderate.		
<25	NP–6	4.0–5.0	0.6–2.0	0.14–0.22	Low	Moderate.		
	NP	5.1–6.5	2.0–6.0	0.10–0.14	Low	Low	None	None.
28–35	8–14	4.5–6.0	0.6–2.0	0.12–0.15	Low	Moderate.		
	NP	4.5–6.0	2.0–6.0	0.10–0.14	Low	Low.		
	NP	4.5–6.0	>6.0	0.05–0.10	Very low	Low.		
<30	NP–10	4.5–6.5	0.2–0.6	0.20–0.23	Low	High	Moderate	None or slight.
41–60	20–35	5.1–6.5	<0.06	0.19–0.21	High	High.		
45–60	24–35	6.6–8.4	<0.06	0.19–0.21	High	High.		
	NP	4.5–5.5	>6.0	0.05–0.10	Very low	Low	None	None.
	NP	4.5–5.5	2.0–6.0	0.05–0.10	Very low	Low.		
25–38	5–16	5.1–7.3	0.6–2.0	0.20–0.23	Low	Moderate	Severe	Severe.
41–50	18–25	6.6–8.4	0.06–0.2	0.10–0.15	Moderate	High.		
<40	NP–17	5.6–7.3	0.6–2.0	0.21–0.23	Low to moderate.	Low to moderate.	Slight	Slight.
32–40	11–17	6.1–8.4	0.6–2.0	0.20–0.22	Moderate	Moderate.		
23–35	4–15	6.6–8.4	0.6–2.0	0.20–0.23	Low	Low.		

TABLE 5.—*Estimated soil properties*

Soil series and map symbols	Depth from surface	USDA texture	Classification		Percentage passing sieve—			
			Unified	AASHTO	No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)
	In							
Glenmora: GoB.	0–8	Silt loam	ML, CL–ML	A–4	100	100	90–100	75–85
	8–32	Silt loam, silty clay loam.	CL	A–4, A–6	100	100	95–100	80–95
	32–62	Silty clay loam	CL	A–6	100	100	95–100	80–95
Gore: GrC, GrD.	0–6	Very fine sandy loam.	ML, CL–ML	A–4	100	100	95–100	60–90
	6–48	Silty clay, clay	CH	A–7–6	100	100	95–100	85–100
	48–73	Silty clay, clay	CH	A–7–6	100	100	95–100	85–100
Guyton: Gu, Gy.	0–17	Silt loam	ML, CL–ML	A–4	100	100	95–100	65–90
	17–69	Silty clay loam	CL	A–6, A–4	100	100	95–100	75–95
	69–80	Loam	ML, CL–ML	A–4	100	100	95–100	65–80
*Kisatchie: KCE. For Cadeville part, see Cadeville series.	0–6	Silt loam	ML	A–4	100	100	85–95	50–65
	6–17	Silty clay, silty clay loam.	CH, CL	A–7–6	100	100	90–100	85–95
	17–24	Clay loam (15 to 30 percent siltstone or sandstone fragments in places).	CH, CL	A–7–6	[2]85–95	65–75	55–65	50–60
	24–50	Sandstone or siltstone.						
Kolin: KnB.	0–8	Silt loam	ML, CL–ML	A–4	100	100	85–100	60–85
	8–24	Silty clay loam	CL	A–6	100	100	95–100	85–95
	24–80	Silty clay, clay	CH	A–7–6	100	100	90–100	75–95
Latanier: La, Lc.	0–6	Silty clay loam, clay, silty clay.	CL, CH	A–6, A–7–6	100	100	100	95–100
	6–30	Clay, silty clay	CH	A–7–6	100	100	100	95–100
	30–60	Silt loam, silty clay loam.	ML, CL, CL–ML	A–4, A–6	100	100	100	80–100
Libuse: LsB.	0–9	Silt loam	ML, CL–ML	A–4	100	100	85–100	55–90
	9–20	Silty clay loam	CL	A–6	100	100	85–100	70–90
	20–42	Loam, silt loam, silty clay loam.	CL	A–6	100	100	85–100	60–90
	42–60	Sandy clay loam, very fine sandy loam.	ML, SM, CL, SC	A–6, A–4	100	100	75–95	45–80
Lucy: LuC.	0–30	Loamy fine sand	SM	A–2–4	100	95–100	50–80	15–30
	30–65	Sandy clay loam, fine sandy loam.	SC	A–4, A–6	100	95–100	60–95	35–50
Malbis: MaC.	0–8	Fine sandy loam	ML, SM	A–4	100	95–100	90–100	40–80
	8–44	Sandy clay loam	CL, CL–ML	A–6, A–4	100	95–100	90–100	60–80
	44–77	Sandy clay loam	CL	A–6	100	95–100	90–100	55–80
McKamie: McC, McD.	0–5	Very fine sandy loam.	ML, SM	A–4	100	100	90–100	40–60
	5–58	Clay	CH, CL	A–7–6	100	100	95–100	85–100
	58–67	Very fine sandy loam, silty clay loam, silt loam.	CL, CL–ML	A–4, A–6, A–7–6	100	100	95–100	50–95
Moreland: MdA, MnA, MnB, MoA, MrA.	0–12	Clay, silty clay, silty clay loam.	CH, CL	A–6, A–7–6	100	100	100	90–100
	12–50	Clay, silty clay	CH	A–7–6	100	95–100	90–100	90–100
	50–64	Silty clay loam, silty clay, silt loam.	CH, CL	A–7–6, A–6	100	95–100	90–100	90–100
Morse: MsC.	0–74	Clay	CH	A–7–6	90–100	85–95	85–95	80–95

significant in engineering—Continued

Liquid limit	Plasticity index	Reaction	Permeability	Available water capacity	Shrink-swell potential	Corrosivity to uncoated steel	Wetness hazard	Flooding hazard
Pct		*pH*	*In per hr*	*In per in of soil*				
<27	NP–7	5.1–6.0	0.6–2.0	0.20–0.22	Low	Moderate	Slight	None.
28–38	8–16	4.5–5.5	0.6–2.0	0.18–0.20	Low	High.		
33–40	12–18	4.5–6.0	0.06–0.2	0.18–0.20	Moderate	High.		
<27	NP–7	5.1–6.5	0.6–2.0	0.20–0.22	Low	Moderate	Slight	None.
53–65	28–40	4.5–6.0	<0.06	0.14–0.18	Very high	High.		
51–75	25–45	5.6–8.4	<0.06	0.14–0.18	Very high	High.		
<27	NP–7	4.5–5.5	0.6–2.0	0.20–0.23	Low	High	Severe	Moderate for Gu.
28–40	8–21	4.5–5.5	0.06–0.2	0.15–0.22	Low	High.		
<26	NP–6	4.5–6.0	0.2–0.6	0.18–0.20	Low	High.		Severe for Gy.
	NP	4.5–5.5	0.6–2.0	0.12–0.20	Low	Low	Slight	None.
45–65	22–36	4.0–5.0	<0.06	0.15–0.18	High	High.		
45–55	22–30	4.0–5.0	<0.06	0.10–0.15	High	High.		
<27	NP–7	5.1–6.5	0.6–2.0	0.18–0.22	Low	Moderate	Slight	None.
30–40	11–18	5.1–6.0	0.2–0.6	0.18–0.22	Moderate	High.		
51–63	25–35	4.5–6.5	<0.06	0.15–0.18	High	High.		
35–75	11–45	6.6–7.8	<0.2	0.18–0.22	Moderate to high.	High	Moderate	Slight.
51–75	26–45	6.6–8.4	<0.06	0.18–0.20	Very high	High.		
<40	NP–17	6.6–8.4	0.06–2.0	0.18–0.22	Low to moderate.	High.		
<27	NP–7	5.1–6.5	0.6–2.0	0.18–0.22	Low	Moderate	Slight	None.
30–40	12–18	4.5–6.0	0.2–0.6	0.18–0.22	Low	High.		
30–40	12–18	4.5–5.5	0.06–0.2	0.10–0.14	Low	High.		
20–35	3–16	4.5–6.0	0.2–2.0	0.14–0.18	Low	Moderate.		
	NP	4.5–5.5	6.0–20	0.08–0.12	Low	Low	None	None.
28–35	8–15	4.5–5.5	0.6–2.0	0.12–0.14	Low	Moderate.		
<21	NP–3	5.1–6.0	0.6–2.0	0.10–0.15	Low	Moderate	None	None.
25–40	6–18	4.5–5.5	0.2–0.6	0.12–0.17	Low	Moderate.		
31–40	11–18	4.5–5.5	0.2–0.6	0.12–0.17	Low	Moderate.		
<23	NP–3	5.1–5.5	0.6–2.0	0.14–0.22	Low	Low	None	None.
45–70	22–40	4.5–5.5	<0.06	0.18–0.20	High	High.		
25–45	5–22	5.1–7.8	0.2–2.0	0.14–0.22	Low to moderate.	Moderate.		
30–75	12–45	6.6–7.8	<0.2	0.18–0.21	Moderate to very high.	High	Moderate	Slight for MdA, MnA, and MnB.
51–75	25–45	6.6–8.4	<0.06	0.18–0.20	Very high	High.		
35–75	15–45	7.9–8.4	<0.2	0.18–0.21	Moderate to very high.	High.		Moderate or severe for MoA and MrA.
55–75	30–45	6.6–8.4	<0.06	0.15–0.18	High	High	None	None.

TABLE 5.—*Estimated soil properties*

Soil series and map symbols	Depth from surface	USDA texture	Classification		Percentage passing sieve—			
			Unified	AASHTO	No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)
	In							
Mowata: Mw.	0–20	Silt loam	ML, CL–ML	A–4	100	100	100	90–100
	20–96	Silty clay	CL, CH	A–7–6, A–6	100	100	100	90–100
Norwood: Nd, Nw.	0–6	Silt loam, silty clay loam.	ML, CL, CL–ML	A–4, A–6, A–7–6	100	100	95–100	70–100
	6–76	Stratified silt loam, silty clay loam, very fine sandy loam.	CL	A–6, A–7–6	100	100	90–100	70–100
Nugent. Mapped only in complex with Rexor soils.	0–7	Fine sandy loam	SM	A–4	100	100	85–95	35–50
	7–90	Fine sandy loam, loamy fine sand.	SM	A–4, A–2–4	100	100	50–95	20–30
Paleudalfs: Pa.	0–14	Silt loam	ML, CL–ML	A–4	100	100	85–100	60–85
	14–20	Silty clay loam	CL	A–6	100	100	95–100	85–95
	20–80	Silty clay, clay	CH	A–7–6	100	100	90–100	75–95
Perry: Pe.	0–17	Clay	CH	A–7–6	100	100	100	95–100
	17–68	Clay	CH	A–7–6	90–100	85–100	75–100	70–100
*Rexor: Re. For Nugent part, see Nugent series.	0–10	Silt loam	ML, CL–ML	A–4	100	100	100	55–85
	10–73	Silt loam	CL, CL–ML	A–4	100	100	100	75–90
Roxana: RnB, Ro, Rr.	0–4	Very fine sandy loam.	ML, CL–ML	A–4	100	100	85–100	50–75
	4–70	Stratified loamy very fine sand, very fine sandy loam, silt loam, sandy clay loam, fine sandy loam.	ML, CL–ML	A–4	100	100	85–100	50–65
Ruston: RsB, RsC.	0–16	Fine sandy loam	SM, ML	A–4, A–2–4	100	100	70–95	30–60
	16–32	Sandy clay loam	SC, CL	A–6	100	100	80–90	35–75
	32–37	Fine sandy loam	SM, ML, CL–ML, SM–SC	A–4, A–2–4	100	100	70–95	30–60
	37–67	Sandy clay loam	SC, CL	A–6	100	100	80–90	35–75
Smithdale: SmE, SmF.	0–8	Fine sandy loam	SM	A–4	100	100	60–80	35–50
	8–19	Sandy clay loam	SC, CL	A–6	100	100	80–95	45–70
	19–80	Fine sandy loam	SM	A–4	100	100	60–80	35–50
Urbo: Ur.	0–12	Silty clay loam	CL	A–6	100	100	95–100	95–100
	12–73	Silty clay, clay	CH	A–7–6	100	100	95–100	95–100
*Vaiden: VWD. For Watsonia part, see Watsonia series.	0–3	Silty clay	CL, CH	A–7–6	100	100	95–100	85–100
	3–32	Clay	CH	A–7–6	100	98	90–100	75–95
	32–75	Silty clay	CL, CH	A–7–6	100	98	95–100	90–95
Watsonia. Mapped only in association with Vaiden soils.	0–5	Silty clay	CH, CL	A–7–6	100	95–100	95–100	85–100
	5–66	Clay	CH	A–7–6	100	95–100	95–100	90–100
Wrightsville: Wr.	0–23	Silt loam	CL, CL–ML	A–4, A–6	100	100	95–100	90–100
	23–45	Silty clay	CH, CL	A–7–6	100	100	95–100	90–100
	45–75	Silty clay or clay	CH, CL	A–7–6, A–6	100	100	95–100	90–100

[1] NP = Nonplastic.
[2] 0 to 5 percent of the 17- to 24-inch layer of the Kisatchie soil is more than 3 inches in diameter.

significant in engineering—Continued

Liquid limit	Plasticity index	Reaction	Permeability	Available water capacity	Shrink-swell potential	Corrosivity to uncoated steel	Wetness hazard	Flooding hazard
Pct		*pH*	*In per hr*	*In per in of soil*				
22–30	2–10	6.1–7.3	0.2–0.6	0.21–0.23	Low	High	Severe	None or slight.
35–58	15–33	5.6–8.4	<0.06	0.18–0.20	High	High.		
<50	NP–25	6.6–8.4	0.6–2.0	0.18–0.22	Low	High	None	Slight.
30–45	11–22	7.9–8.4	0.6–2.0	0.17–0.21	Low	High.		
	NP	4.5–6.5	2.0–6.0	0.06–0.12	Low	Low	Severe	Severe.
	NP	4.5–6.5	0.6–6.0	0.06–0.12	Low	Low.		
<27	NP–7	5.1–6.0	0.6–2.0	0.18–0.22	Low	High	Slight	None.
30–40	12–18	5.1–6.0	0.2–0.6	0.18–0.22	Moderate	High.		
51–65	25–35	5.1–7.8	0.06–0.2	0.15–0.18	High	High.		
51–75	30–45	5.1–7.3	<0.06	0.18–0.20	Very high	High	Severe	Severe.
60–80	35–50	6.6–8.4	<0.06	0.18–0.20	Very high	High.		
<24	NP–4	4.5–6.0	0.6–2.0	0.14–0.18	Low	Moderate	Slight	Severe.
24–31	4–10	4.5–6.0	0.6–2.0	0.14–0.18	Low	Moderate.		
<26	NP–6	6.6–8.4	0.6–2.0	0.10–0.21	Low	Low	None	None or slight for RnB. Moderate or severe for Ro and Rr.
<25	NP–5	6.6–8.4	0.6–2.0	0.10–0.19	Low	Low.		
	NP	5.1–6.5	0.6–2.0	0.14–0.16	Low	Low	None	None.
30–40	11–18	4.5–5.5	0.6–2.0	0.15–0.17	Low	Moderate.		
<27	NP–7	4.5–5.5	0.6–2.0	0.14–0.16	Low	Low.		
30–40	11–18	4.5–5.5	0.6–2.0	0.15–0.17	Low	Moderate.		
	NP	5.1–6.0	2.0–6.0	0.14–0.16	Low	Low	None	None.
28–40	8–18	4.5–5.5	0.6–2.0	0.15–0.17	Low	Low.		
<24	NP–3	4.5–5.5	2.0–6.0	0.14–0.16	Low	Low.		
30–40	12–18	4.5–5.5	0.06–0.2	0.19–0.21	Moderate	High	Severe	Severe.
46–63	20–36	4.5–5.5	<0.06	0.18–0.20	High	High.		
40–55	18–30	5.1–6.0	<0.06	0.18–0.21	High	High	Moderate	None.
51–65	25–40	5.1–7.3	<0.06	0.10–0.15	Very high	High.		
45–70	23–43	5.1–7.8	<0.06	0.10–0.15	Very high	High.		
42–55	20–30	6.6–7.8	<0.06	0.12–0.17	High	High	None	None.
51–75	25–45	7.4–8.4	<0.06	0.12–0.17	Very high	High.		
25–31	5–10	4.5–5.5	0.2–0.6	0.20–0.23	Low	High	Severe	None or slight.
41–65	22–40	4.5–5.5	<0.06	0.17–0.20	High	High.		
35–65	16–40	6.6–8.4	<0.2	0.17–0.22	High to moderate.			

TABLE 6.—*Interpretations for engineering*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. fully the instructions for referring to other series that appear in the first column of this

Soil series and map symbols	Degree and kind of limitation for—						
	Dwellings without basements	Septic tank absorption fields	Sewage lagoons	Sanitary landfill (trench type)	Picnic and camp areas	Playgrounds	Local roads and streets
Acadia: AcA, AcB.	Severe: shrink-swell; low strength.	Severe: percs slowly; wet.	Slight	Severe: wet; too clayey.	Moderate: wet; percs slowly.	Moderate: wet; percs slowly; slope on AcB.	Severe: shrink-swell; low strength.
Alligator: AL.	Very severe: floods.	Severe: floods; wet; percs slowly.	Severe: floods.	Severe: floods; wet; too clayey.	Severe: floods; too clayey; percs slowly; wet.	Severe: floods; wet; percs slowly; too clayey.	Severe: floods; low strength; wet; shrink-swell.
Anacoco: AnB.	Severe: shrink-swell; low strength; wet.	Severe: percs slowly; wet.	Moderate: slope.	Severe: too clayey.	Moderate: wet; percs slowly.	Moderate: percs slowly; slope; wet.	Severe: shrink-swell; low strength.
Aqualfs: AsC.	Severe: wet.	Severe: wet.	Severe: wet.	Severe: wet.	Severe: wet.	Severe: wet; slope where more than 6 percent.	Severe: wet.
Beauregard: BeB.	Moderate: wet; low strength.	Severe: wet; percs slowly.	Severe: wet.	Severe: wet.	Moderate: wet.	Moderate: wet; slope.	Moderate: low strength.
Caddo: Ca	Severe: wet.	Severe: wet.	Severe: wet.	Severe: wet.	Severe: wet.	Severe: wet.	Severe: wet.
Cadeville: CeC, CeE.	Severe: shrink-swell; low strength; slope where more than 15 percent.	Severe: percs slowly; slope where more than 15 percent.	Moderate where slopes are 1 to 7 percent. Severe where slopes are more than 7 percent.	Severe: too clayey; slope where more than 25 percent.	Moderate where slopes are 1 to 15 percent: percs slowly. Severe where slopes are more than 15 percent.	Moderate where slopes are 1 to 6 percent: percs slowly. Severe where slopes are more than 6 percent.	Severe: shrink-swell; low strength; slope where more than 15 percent.
Cahaba: ChB.	Slight	Slight	Severe: seepage.	Severe: seepage.	Slight	Slight	Slight

and other selected uses

The soils in such mapping units may have different properties and limitations, and for this reason it is necessary to follow care-table. Terms used for some soil characteristics in this table are defined in the Glossary]

Degree and kind of limitation for—Continued				Suitability as a source of—			
Small commercial buildings	Pond reservoir areas	Embankments, dikes, and levees	Shallow excavations	Topsoil	Roadfill	Highway subbase	Soil cement base
Severe: shrink-swell; low strength.	Slight	Moderate: compressible; shrink-swell; low strength.	Severe: too clayey; wet.	Poor: thin layer.	Poor: shrink-swell; low strength.	Poor to a depth of 6 inches, not suitable between depths of 6 and 72 inches.	Fair to a depth of 6 inches, very poor between depths of 6 and 72 inches.
Severe: floods; low strength; wet; shrink-swell.	Slight	Moderate: compressible; shrink-swell; low strength.	Severe: too clayey; wet; floods.	Poor: too clayey; wet.	Poor: wet; shrink-swell; low strength.	Not suitable	Very poor to not suitable.
Severe: shrink-swell; low strength; wet.	Slight	Moderate: shrink-swell; compressible; low strength.	Severe: too clayey; wet.	Fair: thin layer.	Poor: low strength; shrink-swell.	Poor to a depth of 11 inches, not suitable between depths of 11 and 96 inches.	Fair to a depth of 11 inches, not suitable between depths of 11 and 96 inches.
Severe: wet.	Slight	Moderate: piping; low strength.	Severe: wet; cutbanks cave.	Poor: too sandy; wet.	Poor: wet	Fair to a depth of 32 inches, not suitable between depths of 32 and 64 inches.	Good to a depth of 32 inches, poor to very poor between depths of 32 and 64 inches.
Moderate: wet; low strength.	Slight	Moderate: erodes easily; low strength; compressible.	Severe: wet.	Poor: thin layer.	Fair: low strength.	Poor to a depth of 8 inches, not suitable between depths of 8 and 75 inches.	Fair to a depth of 8 inches, very poor between depths of 8 and 75 inches.
Severe: wet.	Slight	Moderate: compressible; piping; erodes easily; low strength.	Severe: wet.	Poor: wet	Poor: wet	Poor to a depth of 28 inches, not suitable to poor between depths of 28 and 68 inches.	Fair to a depth of 28 inches, very poor to poor between depths of 28 and 68 inches.
Severe: shrink-swell; low strength; slope where more than 8 percent.	Slight	Moderate: compressible; shrink-swell; low strength.	Severe: too clayey; slope where more than 15 percent.	Fair where slopes are 1 to 15 percent: thin layer. Poor where slopes are more than 15 percent.	Poor: low strength; shrink-swell; slopes more than 25 percent in places.	Poor to a depth of 12 inches, not suitable between depths of 12 and 56 inches, and poor between depths of 56 and 65 inches.	Fair to a depth of 12 inches, very poor to not suitable between depths of 12 and 56 inches, and fair between depths of 56 and 65 inches.
Slight	Moderate: seepage.	Moderate: piping; seepage.	Slight	Fair: thin layer.	Good	Fair to poor to a depth of 9 inches, not suitable to poor between depths of 9 and 25 inches, and fair between depths of 25 and 69 inches.	Good to a depth of 9 inches, fair to poor between depths of 9 and 25 inches, and good between depths of 25 and 69 inches.

TABLE 6.—*Interpretations for engineering*

Soil series and map symbols	Degree and kind of limitation for—						
	Dwellings without basements	Septic tank absorption fields	Sewage lagoons	Sanitary landfill (trench type)	Picnic and camp areas	Playgrounds	Local roads and streets
Crowley: Cr.	Severe: shrink-swell; low strength; wet.	Severe: wet; percs slowly.	Slight	Severe: wet; too clayey.	Moderate: wet; percs slowly.	Severe: wet; percs slowly.	Severe: shrink-swell; low strength.
Eustis: EuC, EuE.	Slight on EuC. Moderate on EuE where slopes are 8 to 15 percent. Severe on EuE where slopes are more than 15 percent.	Slight on EuC. Moderate on EuE where slopes are 8 to 15 percent. Severe on EuE where slopes are more than 15 percent.	Severe: seepage; slope where more than 7 percent.	Severe: seepage; slope where more than 7 percent.	Moderate where slopes are 1 to 15 percent: too sandy. Severe on EuE where slopes are more than 15 percent.	Moderate on EuC: too sandy. Severe on EuE: slope.	Slight on EuC. Moderate on EuE where slopes are 8 to 15 percent. Severe on EuE where slopes are more than 15 percent.
Foley: Fo	Very severe: floods.	Severe: floods; wet; percs slowly.	Severe: floods.	Severe: floods; wet.	Severe: floods; wet.	Severe: floods; wet.	Severe: floods; wet.
Gallion: Ga, Gn.	Moderate: shrink-swell; low strength.	Moderate: percs slowly.	Moderate: seepage.	Moderate: too clayey.	Slight on Ga. Moderate on Gn: too clayey.	Slight on Ga. Moderate on Gn: too clayey.	Moderate: shrink-swell; low strength.
Glenmora: GoB.	Moderate: wet; low strength.	Severe: wet; percs slowly.	Severe: wet.	Severe: wet.	Moderate: wet.	Moderate: wet; slope.	Moderate: low strength.
Gore: GrC, GrD.	Severe: shrink-swell; low strength.	Severe: percs slowly.	Moderate where slopes are 1 to 7 percent. Severe on GrD where slopes are more than 7 percent.	Severe: too clayey.	Moderate: percs slowly; slope on GrD where more than 8 percent.	Moderate on GrC: percs slowly. Severe on GrD: slope.	Severe: shrink-swell; low strength.
Guyton: Gu	Severe: wet.	Severe: percs slowly; wet.	Severe: wet.	Severe: wet.	Severe: wet.	Severe: wet.	Severe: wet.
Gy	Very severe: floods.	Severe: wet; floods; percs slowly.	Severe: floods; wet.	Severe: wet; floods.	Severe: wet; floods.	Severe: wet; floods.	Severe: floods; wet.

and other selected uses—Continued

Degree and kind of limitation for—Continued				Suitability as a source of—			
Small commercial buildings	Pond reservoir areas	Embankments, dikes, and levees	Shallow excavations	Topsoil	Roadfill	Highway subbase	Soil cement base
Severe: wet; shrink-swell; low strength.	Slight	Moderate: compressible; shrink-swell; low strength.	Severe: too clayey; wet.	Fair: thin layer.	Poor: low strength; shrink-swell.	Poor to a depth of 20 inches, not suitable between depths of 20 and 96 inches.	Poor to a depth of 20 inches, very poor between depths of 20 and 96 inches.
Slight on EuC where slopes are 1 to 4 percent. Moderate on EuC where slopes are 4 to 8 percent. Severe on EuE: slope.	Severe: seepage.	Moderate: piping; low strength; seepage.	Severe: too sandy; cutbanks cave; slope where more than 15 percent on EuE.	Poor: too sandy; slope where more than 15 percent on EuE.	Good where slopes are 1 to 15 percent. Fair on EuE where slopes are more than 15 percent.	Fair to a depth of 21 inches, fair to poor between depths of 21 and 72 inches.	Fair to good.
Severe: floods.	Slight	Moderate: compressible; piping; erodes easily; low strength.	Severe: wet; floods; cutbanks cave.	Poor: wet; excess alkali.	Poor: wet	Poor to a depth of 25 inches, not suitable between depths of 25 and 72 inches.	Poor to a depth of 25 inches, not suitable between depths of 25 and 72 inches.
Moderate: shrink-swell; low strength.	Moderate: seepage.	Slight	Slight	Fair on Ga: thin layer. Fair on Gn: too clayey.	Fair: shrink-swell; low strength.	Poor to a depth of 14 inches for Ga, not suitable to a depth of 14 inches for Gn, very poor to poor between depths of 14 and 54 inches.	Fair to a depth of 14 inches for Ga, poor to a depth of 14 inches for Gn, very poor to poor between depths of 14 and 54 inches.
Moderate: low strength; wet.	Slight	Slight	Severe: wet.	Fair: thin layer.	Fair: low strength.	Poor to a depth of 8 inches, not suitable between depths of 8 and 62 inches.	Fair to a depth of 8 inches, very poor between depths of 8 and 62 inches.
Severe: shrink-swell; low strength; slope on GrD where more than 8 percent.	Slight	Moderate: compressible; shrink-swell; low strength.	Severe: too clayey.	Poor: thin layer.	Poor: low strength; shrink-swell.	Poor to a depth of 7 inches, not suitable between depths of 7 and 73 inches.	Fair to a depth of 7 inches, very poor to not suitable between depths of 7 and 73 inches.
Severe: wet.	Slight	Moderate: piping; erodes easily; compressible; low strength.	Severe: wet; cutbanks cave.	Poor: wet	Poor: wet	Fair to a depth of 17 inches, poor to not suitable between depths of 17 and 69 inches.	Poor to a depth of 17 inches, very poor between depths of 17 and 69 inches.
Severe: floods; wet.	Slight	Moderate: piping; compressible; erodes easily; low strength.	Severe: floods; wet; cutbanks cave.	Poor: wet	Poor: wet	Fair to a depth of 17 inches, poor to not suitable between depths of 17 and 69 inches.	Poor to a depth of 17 inches, very poor between depths of 17 and 69 inches.

TABLE 6.—*Interpretations for engineering*

Soil series and map symbols	Degree and kind of limitation for—						
	Dwellings without basements	Septic tank absorption fields	Sewage lagoons	Sanitary landfill (trench type)	Picnic and camp areas	Playgrounds	Local roads and streets
*Kisatchie: KCE. For Cadeville part, see Cadeville series.	Severe: shrink-swell; low strength; slope where more than 15 percent.	Severe: depth to rock; percs slowly; slope where more than 15 percent.	Severe: depth to rock; slope where more than 7 percent.	Severe: depth to rock; too clayey; slope where more than 25 percent.	Moderate where slopes are 5 to 15 percent: percs slowly. Severe where slopes are more than 15 percent.	Severe: slope.	Severe: low strength; shrink-swell; slope where more than 15 percent.
Kolin: KnB	Severe: shrink-swell; wet; low strength.	Severe: wet; percs slowly.	Moderate: slope.	Severe: too clayey; wet.	Moderate: wet; percs slowly.	Moderate: wet; slope; percs slowly.	Severe: shrink-swell; low strength.
Latanier: La, Lc.	Severe: shrink-swell; low strength; wet.	Severe: wet; percs slowly.	Slight. Severe if excavated below a depth of 25 inches: seepage.	Severe: too clayey; wet.	Severe: too clayey; percs slowly.	Severe: percs slowly; too clayey.	Severe: shrink-swell; low strength.
Libuse: LsB	Slight	Severe: percs slowly.	Moderate: slope.	Slight	Slight	Moderate: slope.	Moderate: low strength.
Lucy: LuC	Slight	Slight	Severe: seepage.	Slight	Moderate: too sandy.	Moderate where slopes are 3 to 6 percent: too sandy. Severe where slopes are more than 6 percent.	Slight
Malbis: MaC	Slight	Moderate: percs slowly.	Moderate: slope; seepage.	Slight	Slight	Moderate: slope.	Moderate: low strength.
McKamie: McC, McD.	Severe: shrink-swell; low strength.	Severe: percs slowly.	Moderate where slopes are 1 to 7 percent. Severe on McD where slopes are more than 7 percent.	Severe: too clayey.	Moderate: percs slowly; slope on McD where more than 8 percent.	Moderate on McC: percs slowly; slope. Severe on McD: slope.	Severe: shrink-swell; low strength.
Moreland: MdA, MnA, MnB.	Severe: shrink-swell; wet; low strength.	Severe: wet; percs slowly.	Slight	Severe: wet; too clayey.	Severe: too clayey; percs slowly; wet.	Severe: too clayey; percs slowly; wet.	Severe: shrink-swell; low strength; wet.
MoA, MrA	Very severe: floods.	Severe: wet; floods; percs slowly.	Severe: floods.	Severe: wet; floods; too clayey.	Severe: floods; too clayey; percs slowly; wet.	Severe: too clayey; percs slowly; floods; wet.	Severe: shrink-swell; floods; low strength; wet.

and other selected uses—Continued

Degree and kind of limitation for—Continued				Suitability as a source of—			
Small commercial buildings	Pond reservoir areas	Embankments, dikes, and levees	Shallow excavations	Topsoil	Roadfill	Highway subbase	Soil cement base
Severe: shrink-swell; low strength; slope where more than 8 percent.	Severe: depth to rock.	Moderate: compressible; shrink-swell; low strength.	Severe: too clayey; depth to rock; slope where more than 15 percent.	Poor: thin layer; slope where more than 15 percent.	Poor: thin layer; low strength; shrink-swell; slope where more than 25 percent.	Poor to a depth of 6 inches, not suitable between depths of 6 and 45 inches.	Fair to a depth of 6 inches, not suitable between depths of 6 and 45 inches.
Severe: shrink-swell; low strength; wet.	Slight	Moderate: compressible; shrink-swell; low strength.	Severe: too clayey; wet.	Poor: thin layer.	Poor: low strength; shrink-swell.	Poor to a depth of 8 inches, not suitable between depths of 8 and 80 inches.	Fair to a depth of 8 inches, very poor between depths of 8 and 80 inches.
Severe: shrink-swell; low strength; wet.	Slight	Moderate: compressible; low strength; shrink-swell.	Severe: too clayey; wet.	Poor: too clayey.	Poor: low strength; shrink-swell.	Not suitable	Not suitable to a depth of 20 inches, poor to very poor between depths of 20 and 54 inches.
Slight	Slight	Slight	Slight	Poor: thin layer.	Fair: low strength.	Poor to a depth of 9 inches, not suitable to poor between depths of 9 and 20 inches.	Poor to very poor.
Moderate: slope.	Severe: seepage.	Moderate: seepage; piping; erodes easily.	Slight	Poor: too sandy.	Good	Fair to poor to a depth of 26 inches, not suitable between depths of 26 and 64 inches.	Good to a depth of 26 inches, poor to very poor between depths of 26 and 64 inches.
Slight	Moderate: seepage.	Slight	Moderate: wet.	Fair: thin layer.	Fair: low strength.	Poor to a depth of 8 inches, not suitable between depths of 8 and 77 inches.	Fair to a depth of 8 inches, very poor between depths of 8 and 77 inches.
Severe: shrink-swell; low strength; slope on McD where more than 8 percent.	Slight	Moderate: compressible; shrink-swell; low strength.	Severe: too clayey.	Poor: thin layer.	Poor: low strength; shrink-swell.	Poor to a depth of 5 inches, not suitable between depths of 5 and 67 inches.	Fair to a depth of 5 inches, very poor between depths of 5 and 67 inches.
Severe: shrink-swell; low strength; wet.	Slight	Moderate: compressible; shrink-swell; low strength.	Severe: too clayey; wet.	Poor: too clayey.	Poor: low strength; shrink-swell.	Not suitable	Very poor to not suitable.
Severe: floods; shrink-swell; low strength; wet.	Slight	Moderate: compressible; shrink-swell; low strength.	Severe: too clayey; wet; floods.	Poor: too clayey.	Poor: low strength; shrink-swell.	Not suitable	Very poor to not suitable.

TABLE 6.—*Interpretations for engineering*

Soil series and map symbols	Degree and kind of limitation for—						
	Dwellings without basements	Septic tank absorption fields	Sewage lagoons	Sanitary landfill (trench type)	Picnic and camp areas	Playgrounds	Local roads and streets
Morse: MsC	Severe: shrink-swell; low strength.	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Severe: too clayey; percs slowly.	Severe: too clayey; percs slowly.	Severe: shrink-swell; low strength.
Mowata: Mw	Severe: shrink-swell; wet; low strength.	Severe: wet; percs slowly.	Slight	Severe: wet; too clayey.	Severe: wet; percs slowly.	Severe: wet; percs slowly.	Severe: wet; shrink-swell; low strength.
Norwood: Nd, Nw.	Moderate: low strength.	Moderate: percs slowly.	Moderate: seepage.	Moderate: too clayey.	Slight on Nd. Moderate on Nw: too clayey.	Slight on Nd. Moderate on Nw: too clayey.	Moderate: low strength.
Nugent Mapped only in complex with Rexor soils.	Very severe: floods.	Severe: floods.	Severe: floods; seepage.	Severe: floods; seepage.	Severe: floods.	Severe: floods.	Severe: floods.
Paleudalfs: Pa.	Moderate: shrink-swell; low strength.	Severe: wet; percs slowly.	Slight	Severe: too clayey.	Slight	Moderate: percs slowly; slope.	Severe: shrink-swell; low strength.
Perry: Pe	Very severe: floods.	Severe: floods; percs slowly; wet.	Severe: floods.	Severe: floods; wet; too clayey.	Severe: floods; wet; too clayey; percs slowly.	Severe: floods; percs slowly; wet; too clayey.	Severe: floods; shrink-swell; wet; low strength.
*Rexor: Re For Nugent part, see Nugent series.	Very severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
Roxana: RnB	Slight	Slight	Moderate: seepage.	Slight	Slight	Slight	Moderate: low strength.
Ro, Rr	Very severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
Ruston: RsB, RsC.	Slight	Slight	Moderate: slope; seepage.	Slight	Slight	Moderate where slopes are 1 to 6 percent. Severe on RsC where slopes are more than 6 percent.	Moderate: low strength.

and other selected uses—Continued

Degree and kind of limitation for—Continued				Suitability as a source of—			
Small commercial buildings	Pond reservoir areas	Embankments, dikes, and levees	Shallow excavations	Topsoil	Roadfill	Highway subbase	Soil cement base
Severe: shrink-swell; low strength.	Slight	Moderate: compressible; shrink-swell; low strength.	Severe: too clayey.	Poor: too clayey; excess lime.	Poor: low strength; shrink-swell.	Not suitable	Very poor to not suitable.
Severe: shrink-swell; low strength; wet.	Slight	Moderate: compressible; shrink-swell; low strength.	Severe: wet; too clayey.	Poor: wet	Poor: wet; low strength; shrink-swell.	Poor to a depth of 20 inches, not suitable between depths of 20 and 96 inches.	Poor to a depth of 20 inches, very poor between depths of 20 and 96 inches.
Moderate: low strength.	Moderate: seepage.	Moderate: piping; erodes easily.	Slight	Good on Nd. Fair on Nw: too clayey.	Fair: low strength.	Poor to not suitable.	Poor to very poor.
Severe: floods.	Severe: seepage.	Moderate: piping; low strength; seepage.	Severe: too sandy; floods; cutbanks cave.	Poor: thin layer.	Fair: low strength.	Fair to poor	Good to fair.
Moderate: shrink-swell; low strength.	Slight	Moderate: compressible; low strength; shrink-swell.	Severe: too clayey.	Poor: thin layer.	Poor: low strength; shrink-swell.	Poor to a depth of 14 inches, not suitable between depths of 14 and 80 inches.	Fair to a depth of 14 inches, not suitable between depths of 14 and 80 inches.
Severe: floods; shrink-swell; low strength; wet.	Slight	Moderate: compressible; shrink-swell; low strength.	Severe: too clayey; wet; floods.	Poor: too clayey; wet.	Poor: wet; low strength; shrink-swell.	Not suitable	Very poor to not suitable.
Very severe: floods.	Moderate: seepage.	Moderate: piping; low strength; compressible; erodes easily.	Severe: floods.	Good	Fair: low strength.	Poor to not suitable.	Fair.
Slight	Moderate: seepage.	Moderate: piping; low strength; erodes easily.	Slight	Good	Fair: low strength.	Poor	Fair.
Severe: floods.	Moderate: seepage.	Moderate: piping; low strength; erodes easily.	Severe: floods.	Good	Fair: low strength.	Poor	Fair.
Slight on RsB. Moderate on RsC: slope.	Moderate: seepage.	Slight	Slight	Fair: thin layer.	Fair: low strength.	Poor to fair to a depth of 16 inches, not suitable between depths of 16 and 32 inches, and not suitable to poor between depths of 32 and 67 inches.	Good to fair to a depth of 16 inches, poor to very poor between depths of 16 and 32 inches, and poor to fair between depths of 32 and 67 inches.

TABLE 6.—*Interpretations for engineering*

Soil series and map symbols	Degree and kind of limitation for—						
	Dwellings without basements	Septic tank absorption fields	Sewage lagoons	Sanitary landfill (trench type)	Picnic and camp areas	Playgrounds	Local roads and streets
Smithdale: SmE, SmF.	Moderate where slopes are 8 to 15 percent. Severe on SmF where slopes are more than 15 percent.	Moderate where slopes are 8 to 15 percent. Severe on SmF where slopes are more than 15 percent.	Severe: slope.	Slight where slopes are 8 to 15 percent. Moderate on SmF where slopes are more than 15 percent.	Moderate where slopes are 8 to 15 percent. Severe on SmF where slopes are more than 15 percent.	Severe: slope.	Moderate where slopes are 8 to 15 percent. Severe on SmF where slopes are more than 15 percent.
Urbo: Ur ----	Very severe: floods.	Severe: floods; percs slowly; wet.	Severe: floods.	Severe: floods; too clayey; wet.	Severe: floods; percs slowly.	Severe: floods.	Severe: floods; shrink-swell; low strength.
*Vaiden: VWD. For Watsonia part, see Watsonia series.	Severe: shrink-swell; low strength; slope where more than 15 percent.	Severe: percs slowly; wet; slope where more than 15 percent.	Moderate where slopes are 5 to 7 percent. Severe where slopes are more than 7 percent.	Severe: wet; too clayey.	Severe: too clayey; percs slowly; slope where more than 15 percent.	Severe: slope; too clayey; percs slowly.	Severe: shrink-swell; low strength; slope where more than 15 percent.
Watsonia ----- Mapped only in association with Vaiden soils.	Severe: shrink-swell; low strength; slope where more than 15 percent.	Severe: percs slowly; slope where more than 15 percent.	Moderate where slopes are 5 to 7 percent. Severe where slopes are more than 7 percent.	Severe: too clayey.	Severe: too clayey; percs slowly; slope where more than 15 percent.	Severe: slope; too clayey; percs slowly.	Severe: shrink-swell; low strength; slope where more than 15 percent.
Wrightsville: Wr.	Severe: shrink-swell; wet; low strength.	Severe: percs slowly; wet.	Slight -------	Severe: wet; too clayey.	Severe: wet; percs slowly.	Severe: wet; percs slowly.	Severe: shrink-swell; wet; low strength.

MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes are designated by symbols for both classes; for example, CL–ML.

The AASHTO system is used to classify soils according to those properties that affect use in highway construction and maintenance. In this system, a soil is placed in one of seven basic groups ranging from A–1 through A–7 on the basis of grain-size distribution, liquid limit, and plasticity index. In group A–1 are gravelly soils of high bearing strength, or the best soils for subgrade (foundation). At the other extreme, in group A–7, are clay soils that have low strength when wet and that are the poorest soils for subgrade. Where laboratory data are available to justify a further breakdown, the A–1, A–2, and A–7 groups are divided as follows: A–1–a, A–1–b, A–2–4, A–2–5, A–2–6, A–2–7, A–7–5, and A–7–6. As an additional refinement, the engineering value of a soil material can be indicated by a group index number. The estimated AASHTO classification is given in table 5 for all soils mapped in the survey area.

Soil properties significant in engineering

Several estimates of soil properties significant in engineering are given in table 5. These estimates are made for typical soil profiles, by layers sufficiently different to have different significance for soil engineering. The estimates are based on field observations made in the course of mapping, on test data for these and similar soils, and on experience with the same

and other selected uses—Continued

Degree and kind of limitation for—Continued				Suitability as a source of—			
Small commercial buildings	Pond reservoir areas	Embankments, dikes, and levees	Shallow excavations	Topsoil	Roadfill	Highway subbase	Soil cement base
Severe: slope.	Severe: seepage.	Slight	Moderate on SmE: slope. Severe on SmF: slope.	Fair: thin layer. Poor on SmF where slopes are more than 15 percent.	Good	Poor to fair to a depth of 8 inches, not suitable between depths of 8 and 27 inches, and poor to fair between depths of 27 and 80 inches.	Good to fair to a depth of 8 inches, poor to very poor between depths of 8 and 27 inches, and poor to fair between depths of 27 and 80 inches.
Severe: floods.	Slight	Moderate: compressible; shrink-swell; low strength.	Severe: too clayey; wet; floods.	Poor: thin layer; too clayey.	Poor: shrink-swell; low strength.	Poor to a depth of 6 inches, not suitable to poor between depths of 6 and 73 inches.	Very poor to poor to a depth of 6 inches, very poor between depths of 6 and 73 inches.
Severe: shrink-swell; low strength; slope where more than 8 percent.	Slight	Moderate: shrink-swell; compressible; low strength.	Severe: too clayey; slope where more than 15 percent.	Poor: too clayey.	Poor: low strength; shrink-swell.	Not suitable	Very poor to not suitable.
Severe: shrink-swell; slope where more than 8 percent.	Slight	Moderate: shrink-swell; compressible; low strength.	Severe: too clayey; slope where more than 15 percent.	Poor: too clayey.	Poor: low strength; shrink-swell.	Not suitable	Very poor to not suitable.
Severe: wet; shrink-swell; low strength.	Slight	Moderate: compressible; low strength; shrink-swell.	Severe: too clayey; wet.	Poor: wet	Poor: wet; low strength; shrink-swell.	Poor to a depth of 23 inches, not suitable between depths of 23 and 96 inches.	Poor to very poor to a depth of 23 inches, poor to not suitable between depths of 23 and 96 inches.

kinds of soil in other parishes. Following are explanations of some of the columns in table 5.

The depth to bedrock is not given in table 5, because most soils in the survey area are deep enough over bedrock that bedrock generally does not affect their use. Soft siltstone and sandstone are at a depth of about 24 inches in the Kisatchie soils.

Soil texture is described in table 5 in the standard terms used by the Department of Agriculture (*9*). These terms take into account relative percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If soil contains gravel or other particles coarser than sand, an appropriate modifier is added, as for example, "gravelly loamy sand." "Sand," "silt," "clay," and some of the other terms used in USDA textural classification are defined in the Glossary at the back of this publication.

Liquid limit and plasticity index indicate the effect of water on the strength and consistency of soil material. As the moisture content of a clayey soil is increased from a dry state, the material changes from a semisolid to a plastic state. If the moisture content is further increased, the material changes from a plastic to a liquid state. The plastic limit is the moisture content at which the soil material changes from the semisolid to plastic state; and the liquid limit, from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content

within which a soil material is plastic. Liquid limit and plasticity index are estimated in table 5.

Reaction is the degree of acidity or alkalinity of a soil, expressed in pH values. The pH value and terms used to describe soil reaction are explained in the Glossary.

Permeability is that quality of a soil that enables it to transmit water or air. It is estimated on the basis of those soil characteristics observed in the field, particularly structure and texture. The estimates in table 5 do not take into account lateral seepage or such transient soil features as plowpans and surface crusts.

Available water capacity is the ability of soils to hold water for use by most plants. It generally is defined as the difference between the amount of water in the soil at field capacity and the amount at the wilting point of most crop plants.

Shrink-swell potential is the relative change in volume that can be expected in soil material with changes in moisture content; that is, the extent to which the soil shrinks as it dries out or swells when it gets wet. Extent of shrinking and swelling is influenced by the amount and kind of clay in the soil. Shrinking and swelling of soils causes much damage to building foundations, roads, and other structures. A high shrink-swell potential indicates a hazard to maintenance of structures built in, on, or of material having this rating.

Corrosivity, as used in table 5, pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. Rate of corrosion of uncoated steel is related to soil properties such as drainage, texture, total acidity, and electrical conductivity of the soil material. Corrosivity for concrete is influenced mainly by the content of sodium or magnesium sulfate, but also by soil texture and acidity. Installations of uncoated steel that intersect soil boundaries or soil horizons are more susceptible to corrosion than installations entirely in one kind of soil or in one soil horizon. A corrosivity rating of *low* means that there is a low probability of soil-induced corrosion damage. A rating of *high* means that there is a high probability of damage, so that more resistant concrete and protective measures for steel should be used to avoid or minimize damage.

Wetness hazard refers to estimates of the length of time that free water stays in a soil after the saturation point has been reached. The four ratings used in Rapides Parish are none, slight, moderate, and severe.

Flooding hazard refers to the risk of flooding as a result of stream overflow, runoff from adjacent areas, or local accumulations. Inasmuch as the soils affected and the depth and duration of floods vary considerably with the severity of each rainstorm, the ratings shown in table 5 for flooding hazard are intended only for general guidance. Local records should be consulted for a more accurate estimate of the flooding hazard for any particular soil. The hazard is *none* if the soil is not subject to flooding, *slight* if the soil is flooded less than once in 15 years, *moderate* if the soil is flooded at least once in 15 years, and *severe* if the soil is flooded one or more times each year. The remote possibility of flooding as a result of breaks in the Red River levee system is considered a slight flooding hazard.

Engineering interpretations

The estimated interpretations in table 6 are based on test data for soils in nearby or adjoining parishes and on the experience of engineers and soil scientists with the soils of Rapides Parish. In table 6, ratings are used to summarize limitations or suitability of the soils for the listed purposes.

Soil limitations are indicated by the ratings slight, moderate, and severe. *Slight* refers to soil properties generally favorable for the rated use, that is, limitations that are minor and easily overcome. *Moderate* means that some soil properties are unfavorable but can be overcome or modified by special planning and design. *Severe* refers to soil properties so unfavorable and so difficult to correct or overcome that they require major soil reclamation, special designs, or intensive maintenance. For some uses, the rating of severe is divided to obtain ratings of severe and very severe. *Very severe* indicates one or more soil properties so unfavorable for a particular use that overcoming the limitations is most difficult and costly and generally not practical for the rated use.

Soil suitability is rated by the terms *good, fair,* and *poor,* which have, respectively, meanings approximately parallel to the terms slight, moderate, and severe.

Following are explanations of some of the columns in table 6.

Dwellings without basements and *small commercial buildings* rated in table 6 are not more than three stories high and are supported by foundation footings placed in undisturbed soil. The features that affect the rating of a soil for dwellings and small commercial buildings are those that relate to capacity to support a load and resist settlement under load and those that relate to ease of excavation. Soil properties that affect capacity to support a load are wetness, susceptibility to flooding, density, plasticity, texture, and shrink-swell potential. Those that affect excavation are wetness and slope.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into natural soil. The soil material between depths of 18 inches and 6 feet is evaluated. The soil properties considered are those that affect both absorption of effluent and construction and operation of the system. Properties that affect absorption are permeability, depth to water table or rock, and susceptibility to flooding. Slope affects difficulty of layout and construction and also the risk of soil erosion, lateral seepage, and downslope flow of effluent. Large rocks or boulders increase construction costs.

Sewage lagoons are shallow ponds constructed to hold sewage within a depth of 2 to 5 feet long enough for bacteria to decompose the solids (fig. 9). A lagoon has a nearly level floor, and sides, or embankments, of compacted soil material. The assumption is made that the embankment is compacted to medium density and the pond is protected from flooding. Properties are considered that affect the pond floor and the embankment. Those that affect the pond floor are permeability, organic matter, and slopes; if the floor needs to be leveled, depth to bedrock becomes important. The soil properties that affect the embankment are the engi-

***Figure 9.*—Animal waste disposal lagoon on Norwood silt loam.**

neering properties of the embankment material as interpreted from the Unified soil classification and the amounts of stones, if any, that influence the ease of excavation and compaction of the embankment material.

Sanitary landfill (trench type) is a method for disposing of refuse in dug trenches. The waste is spread in thin layers, compacted, and covered with soil throughout the disposal period. Landfill areas are subject to heavy vehicular traffic. Some soil properties that affect suitability for landfill are ease of excavation, hazard of polluting ground water, and trafficability. The best soils have moderately slow permeability, withstand heavy traffic, and are friable and easy to excavate. Unless otherwise stated, the ratings in table 6 apply only to a depth of about 6 feet, and therefore limitation ratings of *slight* or *moderate* may not be valid much beyond that depth. For some soils, reliable predictions can be made to a depth of 10 or 15 feet. Nevertheless, every site should be investigated before it is selected.

Picnic and camp areas are attractive natural or landscaped areas that are subject to heavy foot traffic. Most of the heavy vehicular traffic, however, is confined to access roads. The best soils have good drainage, are firm when wet but not dusty when dry, are free of flooding during the season of use, and do not have slopes that greatly increase cost of leveling sites or of building access roads.

Playgrounds are areas used intensively for baseball, football, badminton, and similar organized games. Soils suitable for this use need to withstand intensive foot traffic. The best soils have a nearly level surface free of coarse fragments and rock outcrops, good drainage, freedom from flooding during periods of heavy use, and a surface that is firm after rains but not dusty when dry. If grading and leveling are required, depth to rock is important.

Local roads and streets, as rated in table 6, have an all-weather surface expected to carry automobile traffic all year. They have a subgrade of underlying soil material; a base consisting of gravel, crushed rock, or soil material stabilized with lime or cement; and a flexible or rigid surface, usually of asphalt or concrete. These roads are graded to shed water and have ordinary provisions for drainage. They are built mainly from soil at hand, and most cuts and fills are less than 6 feet deep.

Soil properties that most affect design and construction of roads and streets are load-supporting capacity and stability of the subgrade, and the workability and quantity of cut-and-fill material available. The AASHTO and Unified classifications of the soil material, and also the shrink-swell potential, indicate traffic-supporting capacity. Wetness and flooding affect stability of the material. Slope and wetness affect ease of excavation and amount of cut and fill needed to reach an even grade.

Pond reservoir areas hold water behind a dam or embankment. Soils suitable for pond reservoir areas have low seepage, which is related to their permeability

and depth to permeable bedrock or other permeable material.

Embankments, dikes, and levees require soil material resistant to seepage and piping and having favorable stability, shrink-swell potential, shear strength, and compactibility. Presence of stones or organic material in a soil are among factors that are unfavorable.

Shallow excavations require digging or trenching to a depth of less than 6 feet, such as excavations for pipelines, sewer lines, telephone and power transmission lines, basements, open ditches, and cemeteries. Desirable soil properties are good workability, moderate resistance to sloughing, gentle slopes, absence of rock outcrops or big stones, and freedom from both flooding and a high water table.

Topsoil is used for topdressing an area where vegetation is to be established and maintained. Suitability is affected mainly by ease of working and spreading the soil material, as for preparing a seedbed; natural fertility of the material, or the response of plants when fertilizer is applied; and absence of substances toxic to plants. Texture of the soil material and damage that will result at the area from which topsoil is taken are considered in the ratings.

Roadfill (highway subgrade) is soil material used in embankments for roads. The suitability ratings reflect (1) the predicted performance of soil after it has been placed in an embankment that has been properly compacted and provided with adequate drainage and (2) the relative ease of excavating the material at borrow areas.

Highway subbase is soil material used under rigid or flexible pavement roads. It makes up the lower part of the base source and is placed directly on the subgrade. The best soils are those that have a very low plasticity index. Soils with a plasticity index of more than 15 are not suited.

Soil cement base material is used to mix with Portland cement for highway subbase and slope protection against wave action on dams and other embankments exposed to wave action. Suitability ratings are based on the percentage of cement needed to produce soil cement that will withstand many freeze-thaw and wet-dry cycles without deterioration. The best material for this use is generally well-graded silty sand, of which less than 35 percent passes the No. 200 sieve. Soils that have a high clay content are less desirable.

Formation and Classification of Soils

This section discusses the factors and processes of soil formation and tells how they have affected the soils of Rapides Parish. It also explains the system of soil classification.

Factors of Soil Formation

Soils form as a result of the interaction of five major factors: parent material, climate, living organisms in and on the soil, relief, and time. The interrelations of these factors are so complex that few generalizations can be made about one factor unless conditions are specified for the other four. The degree to which each of these factors influence soil formation varies from place to place.

Climate and vegetation are the active forces in soil formation. They act on the parent material and slowly change it into a natural body that has genetically related horizons. Relief modifies the effects of climate and living organisms mainly by its influence on runoff, erosion, and temperature. Parent material also affects the kind of profile that can be formed. Finally, time is essential for the development of parent material into a specific soil.

Parent material

Parent material is the unconsolidated mineral mass in which soils form. The nature of the parent material influences the chemical and mineralogical composition of the soil. It also influences the degree of leaching, reaction, texture, permeability, drainage, and color of the surface and subsoil layers. Textural differences in parent material are accompanied by differences in chemical and mineralogical composition. In general, soils that formed in sandy parent material have a lower nutrient-retaining capacity than those that formed in clay.

In Rapides Parish most of the soils formed in one of three kinds of parent material: Gulf Coastal Plain sedimentary deposits, old alluvium deposited chiefly by an ancestral Red River, and recently deposited Red River alluvium.

The Gulf Coastal Plain sedimentary deposits consist of material that ranges from sand to clay. They are generally acid and highly leached. They are old deposits mostly of Tertiary age, laid down in former extensions of the Gulf of Mexico. This area has been strongly truncated by drainageways. Ruston, Malbis, and Lucy soils are highly leached, acid, and formed in sandy material. In contrast, Anacoco, Kisatchie, and Cadeville soils are highly leached and acid but formed in clayey material.

The old alluvial deposits are of Pleistocene age. Loamy, permeable, old natural levee deposits such as Cahaba soils are leached and acid. Other soils in the area have a loamy surface layer and a clayey subsoil. Such soils as Kolin, Acadia, and Wrightsville soils have a loamy, leached, acid surface layer and a clayey, acid subsoil.

Recent Red River alluvium consists of sediment derived from the reddish prairie soils of Oklahoma and Texas. The soils in this area are typically reddish brown, alkaline, and calcareous. These soils were deposited by the river water during flood stages. The coarser sediment, carried in suspension, was dropped in bands parallel to and near the channel, forming natural levees. The finest sediment settled out of the water left standing in the lower areas. Roxana and Norwood soils formed in natural levees. Moreland and Latanier soils formed in the clayey sediment.

Climate

Rapides Parish has a humid, subtropical climate. The climate is uniform throughout the parish and is characterized by relatively mild winters, hot summers, and abundant rainfall. The climate is affected by cold air moving southward and warm, moist air moving up

from the Gulf of Mexico. More detailed information about the climate is given in the section "General Nature of the Parish."

As a result of these climatic conditions, some of the older soils have developed rapidly, are highly weathered, and are acid. Clay, soluble bases, and colloidal materials have moved downward out of the surface layers and into the subsoil. The Ruston soils, for example, that occur on the older uplands are highly leached and strongly horizonated compared with the Norwood soils on the more recent flood plain that are less leached and weakly horizonated.

Living organisms

Living organisms, including plants, bacteria, fungi, and animals, are important in the formation of soils. Among the chemical and physical properties they influence are changes in content of organic matter and nitrogen, gains or losses in content of plant nutrients, and changes in structure and porosity. Plant roots create openings in the soil and modify porosity. As they grow they break up and rearrange the soil particles. Plants transfer nutrients from the subsoil to the surface layer, and when they die they add humus to the soil. Micro-organisms decompose organic matter and help to improve the physical condition of the soil. Animals such as crawfish and earthworms also influence soil formation by mixing the soil. When animals die they also form humus, which is a source of nutrients.

The soils of Rapides Parish formed under a dense stand of southern yellow pine and hardwoods. On the better drained soils of the uplands, such as Ruston and Malbis soils, pines predominated. On the more poorly drained upland soils, such as Acadia and Wrightsville soils, mixed stands of hardwoods and pines prevailed. On soils of the Red River alluvial plain, such as Moreland and Norwood soils, the dominant vegetation was hardwoods. The difference in kinds of vegetation is related in part to differences in wetness and aeration of the soil.

Relief

Relief is a cause of major differences among soils on the uplands. It influences soil formation through its effect on drainage, erosion, and soil temperature. It also influences the kinds of vegetation that will grow on the soils.

The range of relief in Rapides Parish is wide. Slopes range from 0 to 30 percent. Broad areas of alluvial plains of the Red River and the streams that drain the uplands are level or nearly level. On the uplands, slopes vary from nearly level or gently sloping on divides to strongly sloping on highly dissected areas.

The influence of relief on soil development is exemplified in the strongly sloping area in the northwestern part of Rapides Parish. Cadeville and Kisatchie soils are dominant on these slopes. These soils have a thin, weakly expressed profile because the relief allowed geological removal of the soil almost as fast as it formed. The Ruston, Lucy, and Malbis soils are generally on less steep slopes and have a moderately thick, well-expressed profile. On the gently sloping uplands the influence of relief on soils that have the same parent material is expressed by the well-drained Kolin soils on gentle slopes, the intermediate drainage of Acadia soils on intermediate slopes, and the poorly drained Wrightsville soils in the level areas. The aeration and development of these soils are related to the rate of runoff of surface water.

Time

The length of time required for soil formation depends on the combined influences of the five factors of soil formation. The differences in the length of time that parent material has been exposed to the active factors of soil formation is reflected in the characteristics of the soil profile.

The youngest soils in Rapides Parish are recent in age and are on the Red River alluvial plain. Intermediate in age are the soils of the old alluvial deposits of Pleistocene age. The oldest are the soils of the Gulf Coastal Plain sediment of Tertiary age.

The soils of the Red River alluvial plain have only weakly developed profiles. Roxana and Norwood soils are examples of this development. They retain many of the characteristics of the parent material in color, reaction, and texture. Some development is evidenced by a darkening of the surface layer by organic matter and some slight removal of carbonates from the subsoil.

In contrast, such soils as Kolin and Acadia soils, which formed in older alluvial material, have developed distinct profiles. They have been leached of carbonates to a greater degree. Movement of clay downward from the surface layer into the subsoil is evident.

In the oldest soils, leaching, horizonation, and movement of clay downward is evident to a greater degree than in the younger soils. Ruston, Malbis, and Lucy soils are examples of soils that have these characteristics. In addition, geological erosion is taking place in some of the older soils, such as Kisatchie and Cadeville soils. The rate of this geological erosion has kept these two soils from having well-developed profiles.

Classification of Soils

Soils are classified so that their significant characteristics can be more easily remembered. Classification enables one to assemble knowledge about the soils, to see their relationship to one another and to the whole environment, and to develop principles that help us to understand their behavior and their response to manipulation. First through classification, and then through use of soil maps, the knowledge of soils can be applied to specific fields and other tracts of land.

The narrow categories of classification, such as those used in detailed soil surveys, allow the organization and application of knowledge about soils in managing farms, fields, and woodlands, in developing rural areas, in engineering work, and in many other ways. Soils are placed in broad classes to facilitate study and comparison on large areas such as countries and continents.

The system of soil classification currently used was adopted by the National Cooperative Soil Survey in 1965 (*10*). Because this system is under continual study, readers interested in developments of the cur-

rent system should examine the latest literature available.[5]

The current system of classification has six categories. Beginning with the broadest, these categories are order, suborder, great group, subgroup, family, and series. In this system the criteria used as a basis for classification are soil properties that are observable and measurable. However, these properties are chosen so that the soils of similar genesis, or mode of origin, are grouped. In table 7, the soil series of Rapides Parish are placed in some categories of the current system. Classes of the current system are briefly defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The properties used to differentiate among soil orders are those that tend to give broad climatic groupings of soils. The two exceptions to this are the Entisols and Histosols, which occur in many different climates. Each order is named with a word of three or four syllables ending in *sol* (Alf-i-sol).

SUBORDER. Each order is subdivided into suborders that are based primarily on those soil characteristics that seem to produce classes with the greatest genetic similarity. The suborders narrow the broad climatic range permitted in the orders. The soil properties used to separate suborders are mainly those that reflect either the presence or absence of water-logging, or soil differences that result from the climate or vegetation. The names of suborders have two syllables. The last syllable indicates the order. An example is Udalf (*Ud,* meaning "of humid climates," and *alf,* from Alfisol).

GREAT GROUP. Soil suborders are divided into great groups on the basis of uniformity in the kinds and sequence of major soil horizons and features. The horizons used to make separations are those in which clay, iron, or humus have accumulated; those that have pans that interfere with growth of roots, movement of water, or both; and thick, dark-colored surface horizons. The features used are the self-mulching properties of clay, soil temperature, major differences in chemical composition (mainly calcium, magnesium, sodium, and potassium), dark-red and dark-brown colors associated with basic rocks, and the like. The names of great groups have three or four syllables and are made by adding a prefix to the name of the suborder. An example is Hapludalfs (*Hapl,* meaning "simple horizons," and *udalf*).

SUBGROUP. Great groups are subdivided into subgroups, one representing the central (typic) segment of the group, and others, called intergrades, that have properties of the group and also one or more properties of another great group, suborder, or order. Subgroups may also be made in those instances where soil properties intergrade outside of the range of any other great group, suborder, or order. The names of subgroups are derived by placing one or more adjectives before the name of the great group. An example is Typic Hapludalfs (a typical Hapludalf).

FAMILY. Soil families are separated within a subgroup primarily on the basis of properties important to the growth of plants or on the basis of the behavior of soils when used for engineering. Among the properties considered are texture, mineralogy, reaction, soil temperature, permeability, thickness of horizons and consistence. A family name consists of a series of adjectives preceding the subgroup name. The adjectives are the class names for texture, mineralogy, and so on, that are used as family differentiae. (See table 7.) An example is the fine-silty, siliceous, thermic family of Typic Hapludalfs.

[5] See the unpublished working document "Selected Chapters from the Unedited Text of the Soil Taxonomy," available in the SCS State Office, Alexandria, Louisiana.

Laboratory Data

The physical and chemical properties of some soils in Rapides Parish are given in this section. The results of laboratory analyses of selected soils are shown in table 8. Table 9 gives estimates of mineralogical data that are based on clay mineral analyses. Also in this section are interpretations of how these laboratory data affect the characterization of each of the selected soils. Detailed descriptions of the soils represented in this section are given in the section "Descriptions of the Soils."

Methods of Sampling and Analysis

Soil samples were taken from pits at carefully selected locations. The results of laboratory analyses are reported in tables 8 and 9. All results in table 8 are expressed on an ovendry basis. Unless otherwise stated, the methods used are given in Soil Survey Investigations Report No. 1 (*11*).

The methods used in table 8 are here briefly described. For particle-size distribution analyses, the sand fraction was separated by dry sieving and the silt and clay by the hydrometer method. The percentages of water retained at tensions of 1/3 bar and 15 bar were determined on sieved samples using a pressure plate apparatus. Bulk density and the coefficient of linear extensibility (COLE) were based on undisturbed clod samples. Cation exchange capacity (CEC) is expressed in milliequivalents per 100 grams of soil as determined with 1-normal ammonium acetate (NH_4OAc), pH 7. Organic matter was determined using the Walkley-Black method of wet digestion, acid-dichromate, and multiplying the resulting percentage of organic carbon by a factor of 1.724. Reaction was determined in a 1:1 mixture with distilled water and in a 1:2 mixture with 0.01-molar calcium chloride. Exchangeable sodium is the exchangeable sodium as a percentage of the cation exchange capacity. Percentage base saturation by CEC is the sum of bases divided by the cation exchange capacity, and the percent base saturation by sum is the sum of extractable bases divided by the sum of extractable bases plus the extracted acidity and the result multiplied by 100.

In table 9, mineralogical data on the silt, coarse clay, and fine clay were estimated on the basis of X-ray diffraction.

Interpretation of Soil Characterization Data[6]

The soils of Rapides Parish are quite diverse because they developed on Coastal Plain hills and flat-

[6] A. G. CALDWELL, Professor of Agronomy, Louisiana State University, prepared this section.

TABLE 7.—*Classification of soils*

[Classification in accordance with correlation of September 1972]

Soil series	Family	Subgroup	Order
Acadia	Fine, montmorillonitic, thermic	Aeric Ochraqualfs	Alfisols.
Alligator	Very fine, montmorillonitic, acid, thermic	Vertic Haplaquepts	Inceptisols.
Anacoco	Fine, montmorillonitic, thermic	Vertic Albaqualfs	Alfisols.
Beauregard	Fine-silty, siliceous, thermic	Plinthaquic Paleudults	Ultisols.
Caddo	Fine-silty, siliceous, thermic	Typic Glossaqualfs	Alfisols.
Cadeville	Fine, mixed, thermic	Albaquic Hapludalfs	Alfisols.
Cahaba	Fine-loamy, siliceous, thermic	Typic Hapludults	Ultisols.
Crowley	Fine, montmorillonitic, thermic	Typic Albaqualfs	Alfisols.
Eustis	Sandy, siliceous, thermic	Psammentic Paleudults	Ultisols.
Foley [1]	Fine-silty, mixed, thermic	Albic Glossic Natraqualfs	Alfisols.
Gallion [2]	Fine-silty, mixed, thermic	Typic Hapludalfs	Alfisols.
Glenmora	Fine-silty, siliceous, thermic	Glossaquic Paleudalfs	Alfisols.
Gore	Fine, mixed, thermic	Vertic Paleudalfs	Alfisols.
Guyton [3]	Fine-silty, siliceous, thermic	Typic Hapludalfs	Alfisols.
Kisatchie	Fine, montmorillonitic, thermic	Typic Hapludalfs	Alfisols.
Kolin	Fine-silty, siliceous, thermic	Glossaquic Paleudalfs	Alfisols.
Latanier	Clayey over loamy, mixed, thermic	Vertic Hapludolls	Mollisols.
Libuse	Fine-silty, siliceous, thermic	Typic Fragiudalfs	Alfisols.
Lucy [4]	Loamy, siliceous, thermic	Arenic Paleudults	Ultisols.
Malbis	Fine-loamy, siliceous, thermic	Plinthic Paleudults	Ultisols.
McKamie	Fine, mixed, thermic	Vertic Hapludalfs	Alfisols.
Moreland	Fine, mixed, thermic	Vertic Hapludolls	Mollisols.
Morse	Fine, mixed, thermic	Entic Chromuderts	Vertisols.
Mowata	Fine, montmorillonitic, thermic	Typic Glossaqualfs	Alfisols.
Norwood	Fine-silty, mixed (calcareous), thermic	Typic Udifluvents	Entisols.
Nugent	Sandy, siliceous, thermic	Typic Udifluvents	Entisols.
Perry	Very fine, montmorillonitic, nonacid, thermic	Vertic Haplaquepts	Inceptisols.
Rexor	Fine-silty, siliceous, thermic	Ultic Hapludalfs	Alfisols.
Roxana	Coarse-silty, mixed, nonacid, thermic	Typic Udifluvents	Entisols.
Ruston	Fine-loamy, siliceous, thermic	Typic Paleudults	Ultisols.
Smithdale	Fine-loamy, siliceous, thermic	Typic Paleudults	Ultisols.
Urbo	Fine, mixed, acid, thermic	Aeric Haplaquepts	Inceptisols.
Vaiden [5]	Very fine, montmorillonitic, thermic	Aquentic Chromuderts	Vertisols.
Watsonia [6]	Fine, montmorillonitic, thermic	Vertic Eutrochrepts	Inceptisols.
Wrightsville	Fine, mixed, thermic	Typic Glossaqualfs	Alfisols.

[1] Foley soils are taxadjuncts to the Foley series because they have exchangeable sodium at a shallower depth in the profile.
[2] Gallion soils in mapping unit Gn are taxadjuncts to the Gallion series because these soils have a slightly darker A1 horizon.
[3] Guyton soils are taxadjuncts to the Guyton series because they have more exchangeable sodium.
[4] Lucy soils are taxadjuncts to the Lucy series because they have a B1 horizon with a hue of 7.5YR.
[5] Vaiden soils are taxadjuncts to the Vaiden series because they are slightly shallower to alkaline materials.
[6] Watsonia soils are a variant of the Watsonia series because they have a thicker solum. The term "thick solum variant" was not added to the name, to avoid awkward terminology.

woods in areas of Red River alluvium, Mississippi River alluvium, loessean material, and other geologic materials of various ages.

Anacoco silt loam is believed to have formed in marine clays and volcanic siltstone. The surface layer (A1 and A2 horizons) is low in clay but is underlain at a depth of 11 inches by material high in clay. The profile is very strongly acid to extremely acid to a depth of 70 inches. The calcium:magnesium ratio is more than 1 throughout the profile, but the exchangeable sodium percentage increases with an increase in depth to approximately 11 or 12 percent. The horizons high in clay are also high in exchangeable sodium and COLE because these horizons are also high in the expanding clay minerals montmorillonite and vermiculite. Anacoco soils are somewhat unique in that cristobalite, a variety of quartz, was identified in all silt and coarse clay fractions. This mineral is possibly of volcanic origin. The extreme acidity, fine-textured subsoil, and dimensional instability of this soil make it difficult to use for agronomic or engineering purposes.

Beauregard silt loam is predominantly kaolinite and quartz in the clay and silt fractions. It has moderate amounts of montmorillonite and vermiculite.

Gallion silt loam formed in the older Red River alluvium. It is neutral to medium acid in the surface layer. The soil increases in alkalinity with an increase in depth and has free carbonates in the lower part of the profile. The moderately developed Gallion soil has a moderate content of potassium and is very low in exchangeable phosphorus in the A horizon. The addition of both of these nutrients promotes good growth of crops.

Evidence of profile development in the Gallion soil is indicated by organic matter and acidity in the A1 horizon. Moisture has little effect on the bulk density of this soil. Although percentages of montmorillonite and vermiculite in the clay fraction of the Gallion soil are high, apparently there is not enough clay to cause the COLE to be large. The deeper horizons of this soil are moderately supplied with mica-illite, which should release potassium in weathering.

Gore silt loam formed in old Red River alluvial clay that has a loamy covering a few inches thick. This

TABLE 8.—*Physical and*

[Laboratory analyses were made by the Louisiana Agricultural Experiment

Soil and sample number	Horizon	Depth	Particle-size distribution			Water content at tension of—		Bulk density		COLE
			Sand (2.0–0.05 mm)	Silt (0.05–0.002 mm)	Clay (<0.002 mm)	1/3 bar	15 bar	1/3 bar	Oven-dry	
		Inches	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Grams per cubic centimeter*	*Grams per cubic centimeter*	
Anacoco silt loam (S70La–40–85).[1]	A1	0–4	36.7	59.8	3.5	18.6	3.5			
	A2	4–11	35.3	59.4	5.3	15.5	3.6			
	B21t	11–17	18.1	39.4	42.5	42.9	20.0	1.30	1.79	0.112
	B22t	17–23	13.4	40.0	46.6	37.9	23.1	1.29	1.92	.142
	B23t	23–46	9.2	40.7	50.1	49.6	24.6	1.19	1.81	.150
	C	46–96	4.9	43.8	51.3	45.3	35.4	1.23	1.52	.073
Gallion silt loam (S67La–40–2).[1]	A1	0–5	30.8	55.8	13.4	17.7	6.8	1.50	1.54	.009
	A3	5–14	24.9	56.3	18.8	18.2	6.9	1.52	1.56	.009
	B21t	14–29	27.7	52.4	19.9	22.1	7.9	1.52	1.62	.022
	B22t	29–43	24.0	58.9	17.1	21.5	7.0	1.60	1.67	.014
	B3t	43–54	15.8	64.5	19.7	22.8	8.3	1.52	1.62	.022
	C	54–70								
Gore very fine sandy loam (S69La–40–2). 1 mile west of Otis, 30 feet north of gravel road on east side of pipeline, sec. 23, T. 3 N., R. 4 W.	A1	0–2	45.2	45.7	9.1	16.5	3.7	1.38	1.44	.014
	A2	2–5	39.7	42.7	17.6	17.3	5.7	1.50	1.58	.017
	B21t	5–12	26.0	26.5	47.5	30.8	16.4	1.40	1.71	.069
	B22t	12–18	32.3	22.5	45.2	29.2	18.7	1.38	1.76	.085
	B23t	18–25	41.9	23.5	34.6	26.5	15.9	1.50	1.81	.065
	B24t	25–39	11.5	29.0	59.5	39.3	24.1	1.36	2.02	.141
	B25t	39–52	5.7	28.1	66.2	41.8	25.5	1.40	2.02	.130
	C1	52–71	1.2	27.5	71.3	41.2	25.9	1.34	1.94	.131
	C2	71–81	2.4	34.0	63.6	45.3	23.9	1.48	2.03	.111
Libuse silt loam (S70La–40–87).[1]	A1	0–5	35.1	61.3	3.5	19.8	5.2	1.35	1.35	.000
	B1	5–9	32.0	57.6	10.4	19.4	4.9			
	B2t	9–20	32.8	47.6	19.6	23.3	9.3	1.67	1.73	.012
	Bx1	20–29	36.2	46.5	17.3	21.9	8.9	1.78	1.80	.004
	Bx2	29–42	38.5	47.1	14.4	21.5	7.8	1.79	1.85	.011
	B31t	42–54	36.6	46.8	16.6	20.8	7.3	1.73	1.81	.015
	B32	54–60	42.6	42.5	14.9	22.2	8.1	1.82	1.86	.007

[1] For location of soils, see the representative profile in "Descriptions of the Soils."

sediment has been leached of much of its bases and has become very strongly acid to a depth of 40 inches. Below this the bases are more abundant, and the pH is near neutral to alkaline. Below a depth of 24 inches, the increase of exchangeable sodium could be detrimental to the permeability of this soil. In the final textured horizons bulk density changes greatly with changes in moisture content and results in dimensional instability. This is expressed as an increase in COLE, which is more than 0.1 for all horizons below a depth of 25 inches. Mineralogical analysis indicates a high content of montmorillonite and vermiculite in the fine clay. These minerals probably account for the high COLE. The moderate amount of mica-illite in this soil probably contributes to the substantial amount of exchangeable potassium present.

Libuse silt loam formed in loamy high-terrace material, probably of Red River alluvial origin. The soil is strongly acid to very strongly acid throughout the profile and has less than 30 percent base saturation to a depth of about 40 inches. Exchangeable magnesium exceeds exchangeable calcium in the fragipan. Sodium increases with an increase in depth and exceeds 20 percent in the profile sampled. Cristobalite was identified in the silt, and attapulgite in the coarse clay. Only moderate amounts of montmorillonite were found in the fine clay. Vermiculite and kaolinite were generally more abundant and may account for low COLE. A moderate amount of mica-illite was found in all silt and clay fractions, which seems to indicate a need for potassium fertilization on a regular basis.

General Nature of the Parish

Rapides Parish was named for the rapids or falls in the Red River. It was one of the French districts when Louisiana was held by the French. One of 12 counties created in 1805, it became one of the 19 parishes of the territory when the counties were abolished by the territorial legislature March 31, 1807. Between 1770 and 1796 the area was settled and the great cotton plantations along the river were founded. The parish is one of the largest in the State.

chemical test data

Station, Louisiana State University. The symbol < means less than]

Extractable bases				Extractable acidity	Cation exchange capacity (NH_4 OAc)	Organic matter	Reaction		Exchangeable sodium	Base saturation	
Ca	Mg	Na	K				Water (1:1)	Calcium chloride (1:2)		NH_4 OAc	Sum
Meq per 100 grams of soil	*Meq per 100 grams of soil*	*Meq per 100 grams of soil*	*Meq per 100 grams of soil*	*Meq per 100 grams of soil*	*Meq per 100 grams of soil*	*Percent*	*pH*	*pH*	*Percent*	*Percent*	*Percent*
1.3	0.4	0.3	0.1	8.0	6.4	2.46	5.0	4.0	4.7	33	21
.8	.6	.4	.1	6.2	5.6	.72	4.9	3.8	7.1	34	23
6.0	4.9	1.7	.3	17.7	25.6	.38	4.9	4.0	6.6	50	42
8.6	7.3	3.0	.3	14.6	30.2	.33	4.5	4.0	9.9	64	57
10.4	8.7	4.1	.3	13.8	33.1	.22	4.3	4.1	12.4	71	63
15.4	11.2	4.7	.4	13.6	39.0	.10	4.4	4.2	12.1	81	70
4.2	2.4	.2	.3	3.3	9.9	1.89	5.8	5.1	----	72	68
4.4	3.2	.2	.2	2.5	10.5	.57	6.5	5.7	----	76	76
4.6	5.1	.2	.2	2.4	11.7	.18	7.1	6.1	----	86	81
3.4	5.4	.3	.2	1.9	10.6	.09	7.3	6.4	----	88	83
3.4	7.0	.3	.2	1.8	12.4	.21	7.2	6.3	----	88	86
1.9	.7	.1	.1	6.4	8.0	2.92	4.9	4.4	----	35	30
1.1	.8	.1	.1	8.8	8.6	.86	4.7	4.0	----	24	19
4.5	3.3	.2	.3	19.5	25.0	.62	4.7	4.0	----	33	30
5.1	3.5	.3	.3	17.9	24.2	.38	4.6	4.0	----	38	34
6.4	3.7	.5	.3	12.1	20.0	.26	4.6	4.1	----	54	47
17.7	8.8	1.4	.6	12.6	35.5	.19	4.4	4.3	4.0	80	69
21.6	10.6	2.2	.6	9.7	36.7	.17	4.6	4.6	6.0	95	78
25.0	12.0	3.9	.7	4.7	38.1	.22	6.4	6.4	10.2	----	----
46.3	9.3	3.4	.7	2.2	32.0	.03	7.5	7.3	10.6	----	----
2.3	.9	.2	.2	8.8	7.6	3.41	4.4	4.4	----	47	29
1.3	.8	.3	.1	5.4	5.4	.96	5.3	4.4	----	46	32
.6	.7	.5	.1	7.9	7.3	.22	4.8	4.1	6.8	26	19
.4	.8	.6	.1	7.2	7.2	.09	4.8	4.0	8.3	26	20
.6	1.0	.7	.1	5.5	6.4	.05	5.0	4.1	10.9	38	30
1.4	1.8	1.0	.1	4.5	7.2	.07	5.3	4.3	13.9	60	49
2.0	2.2	1.1	.1	3.1	7.6	.07	5.8	4.5	14.5	71	64

The main crops grown in the parish are cotton and soybeans. Hay and other crops, such as sugarcane, corn, rice, grain sorghum, and truck crops, also contribute greatly to the farm income. There is extensive dairying in this parish, and poultry, beef cattle, and other livestock have recently become increasingly important. The parish is located in the heart of one of the State's largest timber-producing areas, and modern reforestation methods are widely practiced. A part of Rapides Parish is within the Kisatchie National Forest. Alexander State Forest is also located within the parish.

The City of Alexandria, plotted by its first merchant, Alexandria Fulton, and given his baptismal name, was made the parish seat when Rapides Parish was created in 1807. Alexandria and Pineville are small industrial areas that have plants for fabricating steel, producing chemicals, manufacturing paper, processing wood, and manufacturing soap. Alexandria is the geographical center of the State. Two institutions of higher education—a branch of Louisiana State University, opened in 1960, and Louisiana College, a Baptist-affiliated institution—are located in the Pineville-Alexandria area (*6*).

Physiography

Rapides Parish consists of four physiographic features (*8*). They are the nearly level Red River alluvial plain, the nearly level upland drainageways, the gently sloping uplands, and the strongly sloping uplands. The Red River alluvial plain consists of a belt of soils, 6 to 13 miles wide, that completely divides the parish (*3, 5*). It makes up about one-third of the parish. On both sides of this alluvial plain are the uplands. The nearly level upland drainageways constitute the area adjacent to the streams that drain the uplands. It occurs in narrow strips along the smaller streams and in areas as much as 2 miles wide along the Calcasieu River. The gently sloping uplands are located in the southern part of the parish on both sides of the Red River alluvial plain. Slopes range from 0 to 12 percent. The soil materials are of Pleistocene age and have a high content of silt. The strongly sloping uplands are mainly in the

TABLE 9.—*Mineralogical test data* [1, 2]

Soil, sample number, and location	Horizon	Depth from surface	Fine clay (less than 0.2 μm)	Coarse clay (0.2–2 μm)	Silt (2–50 μm)
		Inches			
Anacoco silt loam (S70La–40–85).[3]	A1	0–4	M1,V2,K2,I3,I+C3,M+C3	Q1,K2,V2,I3,M3,Cr3, V+I3,M+I3,M+C3	Q1,F2,Cr3,I3,K3,V3
	B23t	23–46	M1,V2,K2,I3,I+C3,M+C3	Q1,M2,K2,I3,V3,Cr3, V+I3,M+I3,M+C3	Q1,F2,Cr3,I3,K3,V3
	C	46–96	M1,V2,K3,I3,I+C3,M+C3	M1,Q2,K2,I3,Cr3,V3, V+I3,M+I3,M+C3	Q1,F2,C+3,I3,K3,V3
Beauregard very fine sandy loam (S69La–40–1). 122 feet south of gravel road at Sunset Fire Lookout Tower, NW¼SW¼ sec. 26, T. 1 N., R. 3 W.	A1	0–5	K1,V2,M2,I3,M+I3,M+C3	Q1,K2,V3,V+I3, M+I3,M+C3	Q1,K2,I3,F3
	B22t	18–24	K1,M2,V2,I3,M+I3,M+C3	Q2,K2,M2,V3,I3, V+I3,M+I3,M+C3	Q1,F2,I3,Cr3,K3
	B26tg	70–80	K1,M2,V2,I3,M+I3,M+C3	K1,K2,I2,M2,V3, M+I3,M+C3	Q1,F3,I3
Gallion silt loam (S67La–40–2).[3]	A1	0–5	M1,V3,K3,I3,V+I3	K2,Q2,V3,I3,C3	Q1,F2
	B21t	14–29	M1,V3,I3,K3,M+I3	K2,Q2,V3,I3,C3	Q1,F2
	B22t	29–43	M1,V3,V+I3,I3,K3	K2,Q2,V2,I3,C3,M3	Q1,F2
	B3t	43–54	M1,V3,V+I3,I3,K3	K2,Q2,I2,V2,C3,M3	Q1,F2,C3,V3,K3
Gore silt loam (S69La–40–2). 1 mile west of Otis, 30 feet north of gravel road on east side of pipeline, sec. 23, T. 3 N., R. 4 W.	A1	0–2	M1,V2,K2,I3,M+C3	Q1,K2,V2,I3,M3, M+I3,M+C3	Q1,F2,I3,K3
	B22t	12–18	M1,V2,I3,K3,M+C3	Q1,K2,M2,I2,V2, V+I3,M+I3,M+C3	Q1,K2,I2,F3
	C2	71–81	M1,V2,I2,K3,M+C3	Q1,K2,I2,M2,V3, M+I3,M+C3	Q1,F2,I2,K2,Cr3
Libuse silt loam (S70La–40–87).[3]	A1	0–5	V2,M2,K2,I3,I+C3,M+C3	Q1,V2,K2,I3,M3,At3, V+I3,M+I3,M+C3	Q1,F3,I3,K3,Cr3,V3
	B21t	9–20	K1,V2,M2,I3,I+C3,M+C3	K1,Q2,V2,M2,I3,At3, V+I3,M+I3,M+C3	Q1,F3,I3,V3,K3,Cr3
	B32	54–60	M1,K2,V2,I3,I+C3,M+C3	Q1,M2,K2,V3,I3,At3, V+I3,M+I3,M+C3	At1,F3,I3,V3,K3,Cr3

[1] Code for mineralogical data:
A. Abbreviation of mineral names—
At—attapulgite K—kaolinite
C—chlorite M—montmorillonite
Cr—cristobalite V—vermiculite
F—feldspar Q—quartz
I—illite
B. Indication of quantity—
1—abundant component (more than 40 percent)
2—less abundant component (10 to 40 percent)
3—minor component (less than 10 percent)
C. Minerals are listed in decreasing percentages according to their presence in sample from right to left.

[2] Estimates in this table were made by A. G. CALDWELL, professor of agronomy, Louisiana State University.

[3] For location of soil, see representative profile in "Descriptions of the Soils."

northwestern part of the parish. They consist of loamy, sandy, and clayey materials of Tertiary age and have slopes that range from 1 to 30 percent. The upland areas make up about two-thirds of the parish.

The principal drainage systems within the parish are the Red River, Bayous Boeuf and Cocodrie, and the Calcasieu River. Except for the well-defined limits of the Calcasieu River and its tributaries, which drain the western part of the parish, the drainage system in the parish is rather complex, particularly since the construction of some of the drainage channels, the Red River levee system, and other flood-control works. Bayou Rapides and Bayou Jean de Jean, which drain the northwest corner of the parish, are common to each other. Bayou Jean de Jean enters the Red River near Boyce, and Bayou Rapides enters the river at Alexandria. After construction of the levee across the bayou at Hot Wells, the flow of Bayou Jean de Jean and its tributaries was confined to the outlet near Boyce. Flood gates were installed at the mouth of Bayou Rapides to prevent flooding along its course during extremely high stages along the Red River.

Construction of levees along the Red River made it necessary to provide some facilities for draining water away from the river. The most important of these drainage facilities is Catlin Lake Canal, which drains from Alexandria southeastward almost parallel to the Red River through Bayou du Lac in Avoyelles Parish. Bayou Rapides diversion channel diverts water out of the bayou during high water stages.

There are two large semiswamp areas in the parish. One, in the northeastern corner, is the area inundated

frequently by floodwaters of Catahoula Lake, which is fed mainly by Little River. The other is Cocodrie Swamp, the lowland along Bayou Cocodrie, which forms part of the south border of Rapides Parish (*5*).

The principal flood hazard in the parish is on the river side of the levees along the Red River, principally because of the large area contributing to the river north of the parish. Excessively high stages along the Red River also result in floods along the tributaries entering into it, such as Bayou Jean de Jean and Bayou Rigolette.

Aside from the area along the Red River, the most likely hazard of flooding is from unusually heavy local rains. In consequences of such heavy rains, the most rapid runoff and the sharpest flood crest will prevail in the hill section, particularly along the headwaters of the Calcasieu River (*5*).

Farming

According to the U.S. Census of Agriculture, the total number of farms in Rapides Parish has decreased from 1,859 in 1964 to 1,130 in 1969. The total land in farms decreased from 241,455 acres in 1964 to 197,839 acres in 1969. The average size of farms increased from 129.9 acres in 1964 to 175 acres in 1969. In 1940 farming in Rapides Parish employed 26.6 percent of the work force, but by 1960 this figure had dropped to 5.4 percent.

In 1969, 129,404 acres was planted to crops. The principal crops are soybeans, cotton, corn, and sugarcane. Practically all crops are grown on the Red River alluvial plain. In 1969, there were 66,753 cattle, 7,484 hogs, and 337,167 poultry in the parish. There was 44,431 acres of pasture.

Climate [7]

Rapides Parish is in the Central Division of Louisiana. This subtropical transitional climatic region is affected alternately by flows of cold dry air moving southward and warm moist air moving northward. Transitions from one flow to another frequently bring significant, and sometimes abrupt, weather changes.

Summers are consistently warm, but maximum temperatures rarely exceed 100° F at Alexandria, although 109° was recorded on July 13, 1901. Temperatures of 90° or warmer can be expected each year from May through October. Individual years may have from 80 days or fewer to more than 125 days of 90° temperatures (table 10).

Winters are comparatively mild. Most years have one or more days when the temperature drops to 24° or colder (table 11). At Alexandria, 3° was recorded on February 13, 1899. Temperatures of 32° or colder can be expected from late October to early April, but individual years may have from fewer than 20 days to more than 60 days. Cold spells are usually of short duration, and only a few years can be expected to have a day when the temperature does not rise about 32°. The ground freezes briefly to shallow depths on some cold mornings.

Precipitation occurs about two days out of seven on an annual basis. Rainfall is mainly in the form of showers. Periods of long steady rain sometimes occur during winter and spring, but are not frequent.

During the cooler months, the weather pattern is generally rain, followed by first cool and then moderate temperatures with a few balmy days, finally followed by another rain. Snowfall is insignificant, the average being less than an inch per year. In many years there is no snow. Several inches have been measured in individual storms during December, January, and February. These snows occur frequently enough for each generation to remember "the snowstorm." Glaze or ice storms have caused widespread damage at rare intervals.

Thunderstorms are likely to occur during any season. Most months have 1 day or more with thunder; the annual average is 60 to 70 days. Almost all rainy days in summer have afternoon and evening thunder and lightning, frequently in July and August. Fewer thunderstorms occur in fall and in winter than in any other season, with the fewest in January. Cold-season thunderstorms are usually associated with passing weather systems (fronts and squall lines); they are likely to occur at any hour and usually have higher winds than those during summer. Torrential rains may occur with these weather systems. In 1 year out of 10, rainfall will be more than 5.4 inches during a 6-hour period and more than 7.8 inches during a 24-hour period.

Occasionally during the warmer months, northerly and westerly winds bring extended periods of dry hot weather, and the danger of forest fires increases. Locations in Rapides Parish have recorded periods in excess of 1 month when no rain fell. Dry weather during fall assists harvests in many years.

Evaporation from Class A Weather Service pans is about 65 inches annually, of which 75 percent, or about 49.5 inches, occurs from May through October. Mean annual open lake evaporation is about 48 inches.

Annual mean relative humidity is about 74 percent. Humidity values under 30 percent are rare, averaging only some 2 percent of the hours during the year, and are least frequent in the summer. Humidity over 80 percent totals about 42 percent of the hours, and is most frequent during early mornings and periods of rain. At times heavy fog occurs during night and early morning, but it rarely lasts continuously through the day.

Sunshine averages slightly less than two-thirds of the possible annual value, or less than 2,800 hours per year.

Windspeed is generally less than 10 miles per hour except during storms, when speeds may exceed 40 miles per hour, with substantially higher brief gusts. Wind direction generally is southerly except during September and October, when it is frequently easterly. At a standard 30-foot instrument elevation, it is estimated that a sustained windspeed of 85 to 90 miles per hour has a 50-year average recurrence in Rapides Parish.

Water Resources

Rapides Parish possesses abundant water resources (*4*). Ground water furnishes nearly all water supplies,

[7] By GEORGE W. CRY, climatologist for Louisiana, National Weather Service, U.S. Department of Commerce.

TABLE 10.—*Temperature and precipitation data*

[Data from Woodworth State Forest, Alexandria, and Alexandria WSO (Esler Field)]

Month	Temperature				Precipitation		
	Average daily maximum	Average daily minimum	Average highest	Average lowest	Average total	One year in 10 will have—	
						Less than—	More than—
	°F	°F	°F	°F	In	In	In
January	59	38	76	18	5.0	1.9	8.4
February	63	40	78	23	4.9	2.0	8.3
March	70	46	82	29	5.1	1.8	9.4
April	78	56	87	39	5.4	1.8	9.5
May	85	62	92	48	5.7	1.8	10.8
June	90	69	96	58	4.4	1.4	8.2
July	93	72	98	65	5.1	1.8	8.9
August	92	71	98	63	3.6	.9	7.2
September	88	66	94	52	3.4	.9	7.0
October	80	54	90	37	3.6	.7	8.0
November	69	45	83	27	5.0	.9	10.6
December	61	39	77	23	6.0	3.4	11.9
Year	77	55	99	17	57.2	43.2	72.7

but the resource has been developed to only a slight extent. Surface water is used both for domestic and industrial supplies, and its use for irrigation is increasing.

Ground water occurs in sands of Miocene age, upland Pleistocene deposits, and alluvium of the Red River Valley. Freshwater in the Miocene rocks is available at depths ranging from 200 feet in the northeastern part of the parish to 3,200 feet in the southwest corner. The upland deposits and valley alluvium of Pleistocene age, which cover most of the parish, have a maximum thickness of about 200 feet, and, except in a few localities near the northeast corner of the parish, they contain freshwater throughout the thickness.

Miocene aquifers in the southwestern part of Rapides Parish and the alluvium of the Red River Valley constitute the most important potential sources of water. The deep-lying thick beds of sand west of Glenmora are a possible source of large industrial supplies. The Red River Valley alluvium also can provide great quantities of water for irrigation and, with treatment, for industrial and municipal use.

A large quantity of surface water is available from reservoirs, lakes, and the Red River. Cotile Reservoir (1,775 acres), Indian Creek Reservoir (2,250 acres), and Kincaid Reservoir (1,920 acres) have recently been constructed to store water for irrigation and for recreational purposes. Valentine Lake (80 acres) is in the Kisatchie National Forest and is used mainly for recreational purposes. The quality of the Red River water must be improved before it can be used for domestic or industrial purposes. The water is suitable for irrigation purposes, but at low river stages the content of salt is high.

Industry

Industries in Rapides Parish are many and varied. Production of forest products is probably the largest single industry (7). Among the lumber-related industries are wood processing, veneering, creosoting, millwork, and furniture and paper manufacturing.

A number of agriculture-related industries are in the parish. Examples are cotton gins, cotton and oil companies, a sugar refining mill, meat packing, and milk and poultry processing companies.

A number of pits along the Alexandria-Lake Charles Highway between Glenmora and Alexandria and a large pit north of Pineville produce large quantities of sand and gravel. Several pits are near Boyce in the western part of Rapides Parish.

References

(1) American Association of State Highway [and Transportation] Officials. 1961. Standard specifications for highway materials and methods of sampling and testing. Ed. 8, 2 vol., illus.

(2) American Society for Testing and Materials. 1974. Method for classification of soils for engineering purposes. ASTM Stand. D 2487–69. *In* 1974 Annual Book of ASTM Standards, Part 19, 464 pp., illus.

(3) Department of Conservation, Louisiana Geological Survey. 1940. Geology of Avoyelles and Rapides Parishes. Geol. Bull. No. 18, 54–56.

(4) Department of Conservation, Louisiana Geological Survey and Louisiana Department of Public Works. 1966. Water resources of Rapides Parish, Louisiana. Water Resource Bull. No. 8, p. 1, 3.

(5) Louisiana State University, College of Commerce. 1949. An economic survey of Rapides Parish. pp. 2.0201–03.

(6) Public Affairs Research Council of Louisiana. 1965. A statistical profile of Rapides Parish, history.

(7) State of Louisiana, Department of Public Works and Rapides Parish Planning Board. 1947. Rapides Parish resources and facilities—Rapides Parish planning board. Ch. V, XVII, p. 95, 97.

(8) United States Department of Agriculture. 1921. Soil survey of Rapides Parish, Louisiana. *In:* Field Operations of the Bureau of Soils: 1916. pp. 1121–59, illus.

(9) ———— 1951. Soil survey manual. U.S. Dep. Agric. Handb. No. 18, 503 pp., illus.

TABLE 11.—*Probabilities of last freezing temperatures in spring and first in fall*

[Data from Woodworth State Forest, Alexandria, and Alexandria WSO (Esler Field)]

Probability	Dates for given probability and temperature		
	24 °F or lower	28° F or lower	32 °F or lower
Spring:			
1 year in 10 later than	March 1	March 15	March 31
2 years in 10 later than	February 21	March 8	March 26
5 years in 10 later than	February 4	February 21	March 15
Fall:			
1 year in 10 earlier than	November 17	November 8	October 30
2 years in 10 earlier than	November 27	November 14	November 4
5 years in 10 earlier than	December 16	November 26	November 14

(10) ———— 1960. Soil classification, a comprehensive system, 7th approximation. 265 pp., illus. [Supplements issued in March 1967 and in September 1968]
(11) ———— 1967. Soil survey investigations report no. 1: Soil survey laboratory methods and procedures for collecting soil samples. 50 pp.

Glossary

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Available water capacity (also termed available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil.

Base saturation. The degree to which material that has base-exchange properties is saturated with exchangeable cations other than hydrogen, expressed as a percentage of the cation-exchange capacity.

Calcareous soil. A soil containing enough calcium carbonate (often with magnesium carbonate) to effervesce (fizz) visibly when treated with cold, dilute hydrochloric acid.

Channery soil. A soil that contains thin, flat fragments of sandstone, limestone, or schist, as much as 6 inches in length along the longer axis. A single piece is called a fragment.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of clay on the surface of a soil aggregate. Synonyms: clay coat, clay skin.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrations of compounds, or of soil grains cemented together. The composition of some concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are examples of material commonly found in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft. When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Cutbanks cave. Unstable walls of cuts made by earthmoving equipment. The soil sloughs easily.

Drainage class (natural). Refers to the conditions of frequency and duration of periods of saturation or partial saturation that existed during the development of the soil, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven different classes of natural soil drainage are recognized.

Excessively drained soils are commonly very porous and rapidly permeable and have a low available water capacity.

Somewhat excessively drained soils are also very permeable and are free from mottling throughout their profile.

Well-drained soils are nearly free from mottling and are commonly of intermediate texture.

Moderately well drained soils commonly have a slowly permeable layer in or immediately beneath the solum. They have uniform color in the A and upper B horizons and mottling in the lower B and the C horizons.

Somewhat poorly drained soils are wet for significant periods but not all the time, and some soils commonly have mottling at a depth below 6 to 16 inches.

Poorly drained soils are wet for long periods and are light gray and generally mottled from the surface downward, although mottling may be absent or nearly so in some soils.

Very poorly drained soils are wet nearly all the time. They have a dark-gray or black surface layer and are gray or light gray, with or without mottling, in the deeper parts of the profile.

Fertility, soil. The quality of a soil that enables it to provide compounds, in adequate amounts and in proper balance, for the growth of specified plants, when other growth factors such as light, moisture, temperature, and the physical condition of the soil are favorable.

Fragipan. A loamy, brittle, subsurface horizon that is very low in organic-matter content and clay but is rich in silt or very fine sand. The layer is seemingly cemented. When dry, it is hard or very hard and has a high bulk density in comparison with the horizon or horizons above it. When moist, the fragipan tends to rupture suddenly if pressure is applied, rather than to deform slowly. The layer is generally mottled, is slowly or very slowly permeable to water, and has few or many bleached fracture planes that form polygons. Fragipans are a few inches to several feet thick; they generally occur below the B horizon, 15 to 40 inches below the surface.

Gilgai. Typically, the microrelief of Vertisols—clayey soils that have a high coefficient of expansion and contraction with changes in moisture; usually a succession of microbasins and microknolls, in nearly level areas, or of microvalleys and microridges that run with the slope.

Gleyed soil. A soil in which waterlogging and lack of oxygen have caused the material in one or more horizons to be neutral gray in color. The term "gleyed" is applied to soil

horizons with yellow and gray mottling caused by intermittent waterlogging.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O horizon.—The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon.—The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these. Combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

Loess. Fine-grained material, dominantly of silt-sized particles, that has been deposited by wind.

Mottling, soil. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent.* The size measurements are these: *fine,* less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium,* ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter, along the greatest dimension; and *coarse,* more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Parent material. Disintegrated and partly weathered rock from which soil has formed.

Ped. An individual natural soil aggregate, such as a crumb, a prism, or a block, in contrast to a clod.

Percs slowly. The slow movement of water through the soil adversely affects the specified use.

Piping. Moving water forms subsurface tunnels or pipelike cavities.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents that commonly show as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on exposure to repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade, whereas ironstone cannot be cut but can be broken or shattered with a spade. Plinthite is one form of the material that has been called laterite.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

	pH		*pH*
Extremely acid	Below 4.5	Neutral	6.6 to 7.3
Very strongly acid	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid	6.1 to 6.5	Very strongly alkaline	9.1 and higher

Sand. Individual rock or mineral fragments in a soil that range in diameter from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be of any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

GUIDE TO MAPPING UNITS

The suitability of the soils for use as cropland is discussed under management of the soils for crops and pasture and the soil descriptions. The capability classification system is discussed on pages 42 to 43. For information about managing the soils for woodland, see page 43 and for wildlife, page 47.

Map symbol	Mapping unit	Described on page	Capability unit
			Symbol
AcA	Acadia silt loam, 0 to 1 percent slopes	7	IIIw-1
AcB	Acadia silt loam, 1 to 3 percent slopes	7	IIIe-1
AL	Alligator association, frequently flooded	8	Vw-1
AnB	Anacoco silt loam, 1 to 4 percent slopes	9	IVe-1
AsC	Aqualfs, 1 to 8 percent slopes	10	VIe-1
BeB	Beauregard silt loam, 1 to 3 percent slopes	10	IIe-2
Ca	Caddo silt loam	11	IIIw-2
CeC	Cadeville very fine sandy loam, 1 to 5 percent slopes	12	IVe-1
CeE	Cadeville very fine sandy loam, 5 to 20 percent slopes	12	VIe-2
ChB	Cahaba fine sandy loam, 1 to 3 percent slopes	13	IIe-3
Cr	Crowley silt loam	14	IIIw-3
EuC	Eustis loamy fine sand, 1 to 8 percent slopes	14	IIIs-1
EuE	Eustis loamy fine sand, 8 to 30 percent slopes	15	VIe-3
Fo	Foley silt loam, occasionally flooded	15	IVw-1
Ga	Gallion silt loam	16	I-2
Gn	Gallion silty clay loam	16	IIw-1
GoB	Glenmora silt loam, 1 to 3 percent slopes	17	IIe-2
GrC	Gore very fine sandy loam, 1 to 5 percent slopes	18	IVe-1
GrD	Gore very fine sandy loam, 5 to 12 percent slopes	18	VIe-2
Gu	Guyton complex	19	IIIw-2
Gy	Guyton complex, frequently flooded	19	Vw-4
KCE	Kisatchie-Cadeville association, hilly	20	VIe-2
KnB	Kolin silt loam, 1 to 5 percent slopes	21	IIIe-2
La	Latanier silty clay loam	22	IIIw-4
Lc	Latanier clay	22	IIIw-5
LsB	Libuse silt loam, 1 to 5 percent slopes	24	IIIe-3
LuC	Lucy loamy fine sand, 3 to 8 percent slopes	25	IIIs-2
MaC	Malbis fine sandy loam, 1 to 5 percent slopes	25	IIIe-2
McC	McKamie very fine sandy loam, 1 to 5 percent slopes	26	IIIe-4
McD	McKamie very fine sandy loam, 5 to 12 percent slopes	27	VIe-2
MdA	Moreland silty clay loam, 0 to 1 percent slopes	27	IIIw-4
MnA	Moreland clay, 0 to 1 percent slopes	27	IIIw-5
MnB	Moreland clay, gently undulating	28	IIIw-6
MoA	Moreland clay, 0 to 1 percent slopes, occasionally flooded	28	IVw-1
MrA	Moreland clay, 0 to 1 percent slopes, frequently flooded	28	Vw-1
MsC	Morse clay, 1 to 5 percent slopes	29	IVe-2
Mw	Mowata silt loam	30	IIIw-7
Nd	Norwood silt loam	31	I-1
Nw	Norwood silty clay loam	31	IIw-2
Pa	Paleudalfs	33	IIIw-3
Pe	Perry clay, frequently flooded	34	Vw-1
Re	Rexor-Nugent complex, frequently flooded	35	Vw-3
RnB	Roxana very fine sandy loam, gently undulating	36	IIe-1
Ro	Roxana very fine sandy loam, occasionally flooded	36	IVw-2
Rr	Roxana soils, frequently flooded	36	Vw-2
RsB	Ruston fine sandy loam, 1 to 3 percent slopes	37	IIe-3
RsC	Ruston fine sandy loam, 3 to 8 percent slopes	37	IIIe-5
SmE	Smithdale fine sandy loam, 8 to 12 percent slopes	38	IVe-3
SmF	Smithdale fine sandy loam, 12 to 20 percent slopes	38	VIe-1
Ur	Urbo silty clay loam, frequently flooded	39	Vw-1
VWD	Vaiden-Watsonia association, rolling	39	VIe-4
Wr	Wrightsville silt loam	41	IIIw-7

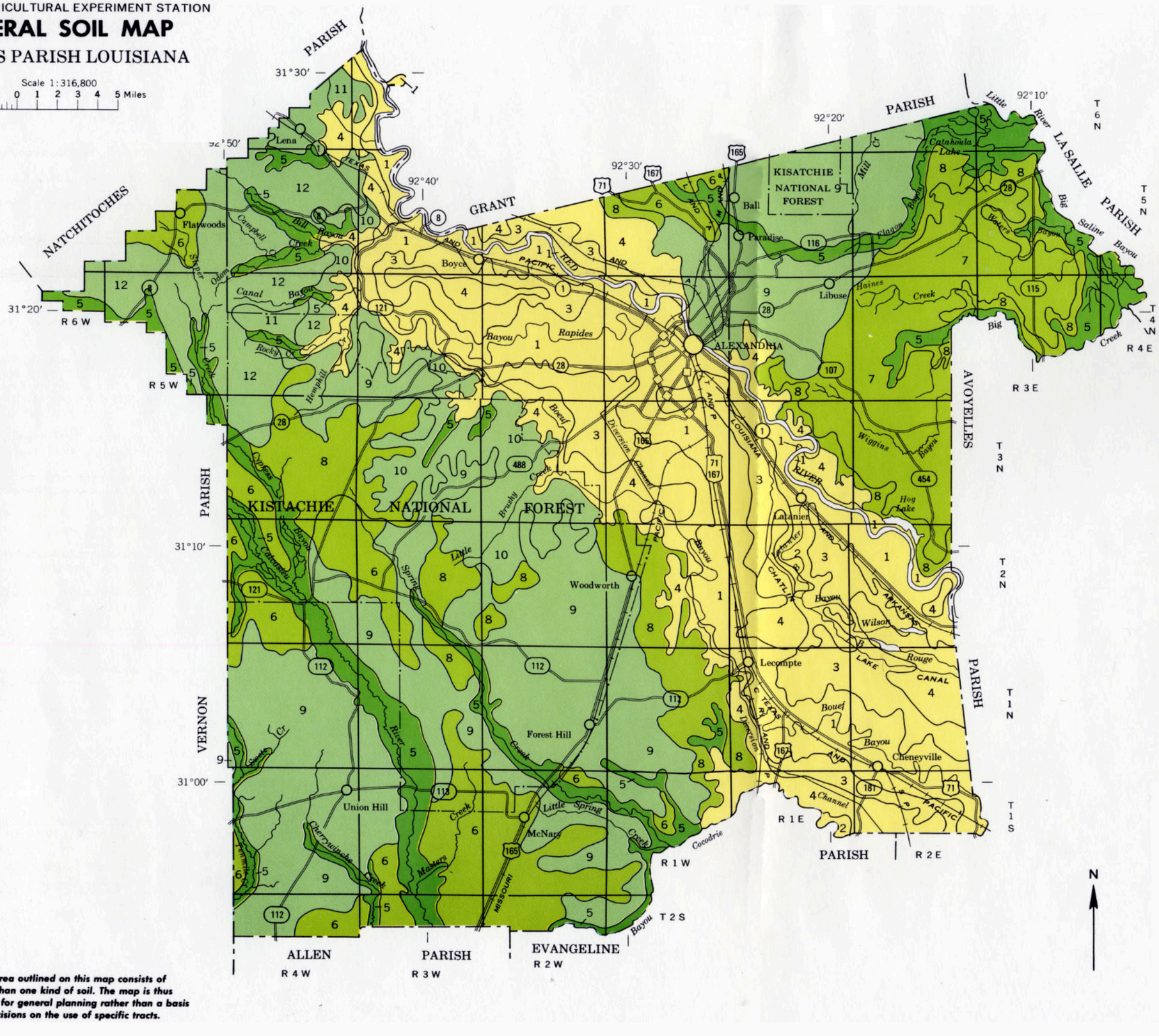
☆ U.S. GOVERNMENT PRINTING OFFICE: 1980 -255-291/71

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
FOREST SERVICE
LOUISIANA AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP

RAPIDES PARISH LOUISIANA

Scale 1:316,800
1 0 1 2 3 4 5 Miles



SOIL ASSOCIATIONS*

NEARLY LEVEL SOILS ON THE RED RIVER ALLUVIAL PLAIN

1 NORWOOD: Nearly level, alkaline, loamy soils

2 GALLION: Nearly level, acid, loamy soils

3 MORELAND–LATANIER: Nearly level, alkaline, clayey soils

4 MORELAND: Nearly level, alkaline, clayey soils that are subject to flooding

NEARLY LEVEL SOILS IN UPLAND DRAINAGEWAYS

5 GUYTON: Nearly level, loamy soils that are subject to flooding

MAINLY NEARLY LEVEL TO GENTLY SLOPING SOILS ON UPLANDS

6 BEAUREGARD–CADDO: Nearly level to very gently sloping, loamy soils

7 ACADIA–KOLIN: Nearly level to gently sloping, loamy soils that have a clayey subsoil

8 GORE: Very gently sloping to moderately sloping, loamy soils that have a clayey subsoil

MAINLY GENTLY SLOPING TO MODERATELY STEEP SOILS ON UPLANDS

9 RUSTON–MALBIS: Very gently sloping to moderately sloping, loamy soils

10 SMITHDALE: Strongly sloping to moderately steep, loamy soils

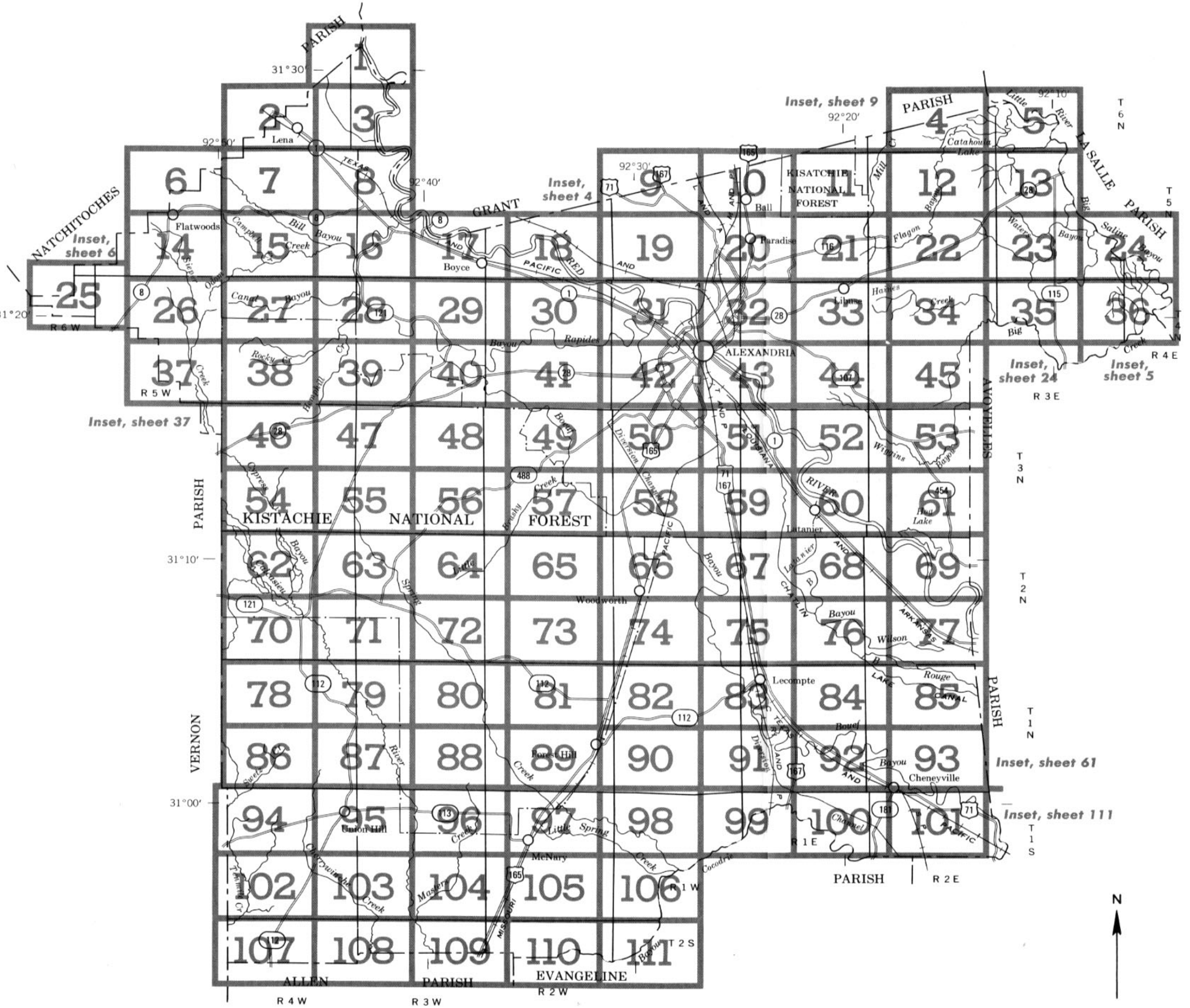
11 VAIDEN–WATSONIA: Moderately sloping to moderately steep, clayey soils

12 KISATCHIE–CADEVILLE: Moderately sloping to hilly, loamy soils that have a clayey subsoil

*Terms for texture refer to the surface layer and subsoil unless otherwise stated.

Compiled 1977

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

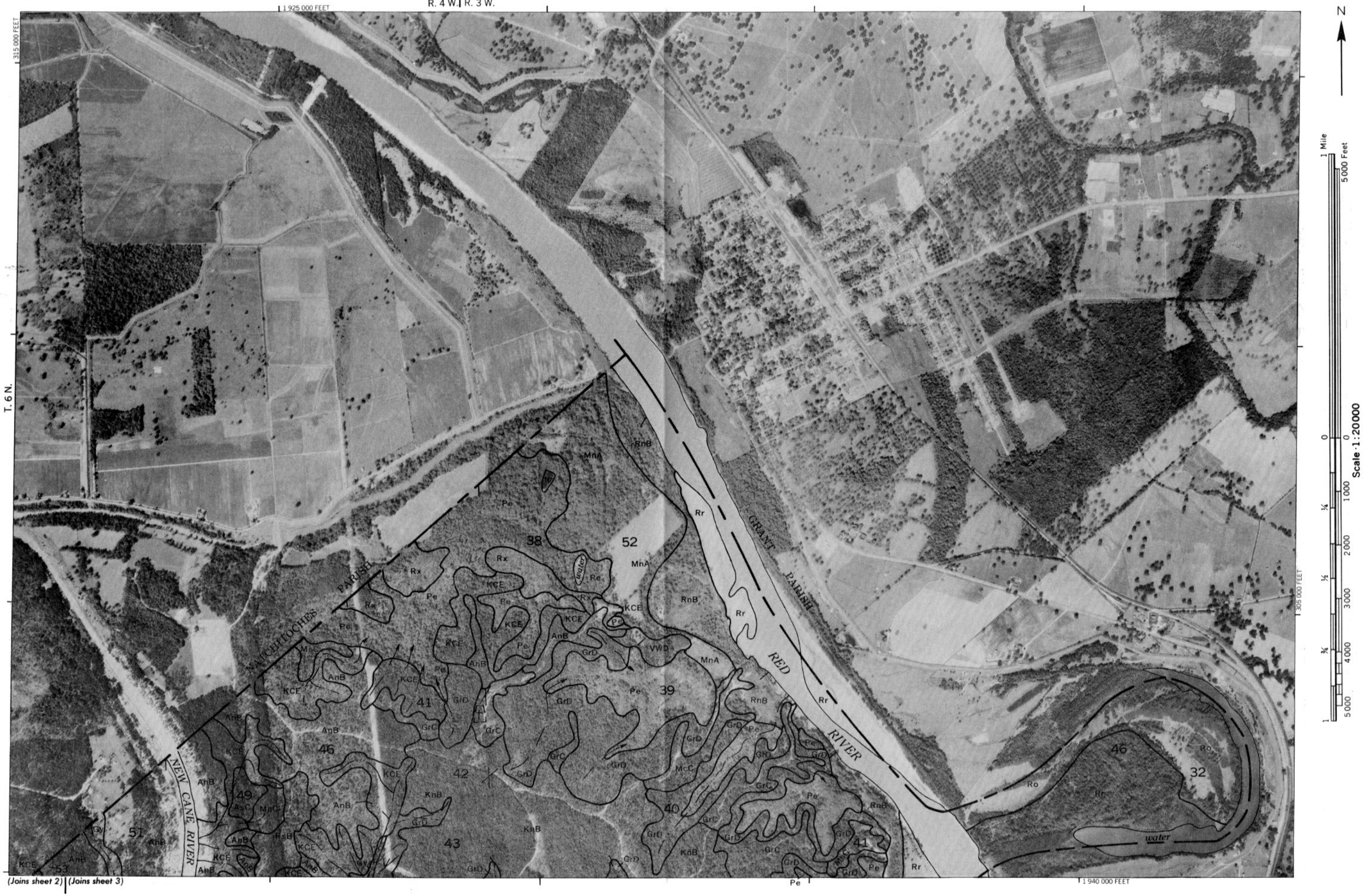


INDEX TO MAP SHEETS

RAPIDES PARISH LOUISIANA

Scale 1:316,800

1 0 1 2 3 4 5 Miles


1
N
1 925 000 FEET
R. 4 W. | R. 3 W.
315 000 FEET
T. 6 N.
305 000 FEET
1 940 000 FEET
(Joins sheet 2)
(Joins sheet 3)
GRANT PARISH
NATCHITOCHES PARISH
RED RIVER
NEW CANE RIVER
water
1 Mile
5 000 Feet
Scale 1:20000
0
¼
½
¾
1
1000
2000
3000
4000
5000
38
39
40
41
42
43
46
49
51
52
53
32
RnB
MnA
Pe
Rx
KCE
Rr
Ro
AnB
GrD
GrC
McC
KnB
VWD
AsC
RsB
Gv


N
1 Mile
5000 Feet
Scale 1:20000
R. 1 W. | R. 1 E.
2 035 000 FEET
280 000 FEET
270 000 FEET
2 020 000 FEET
T. 5 N.
GRANT PARISH
INDEFINITE
BOUNDARY
CAMP BEAUREGARD
KISATCHIE NATIONAL FOREST
Ball
(Joins sheet 9)
(Joins sheet 11)
(Joins sheet 20)
RsC
BeB
AsC

RAPIDES PARISH, LOUISIANA — SHEET NUMBER 100

100

N

R. 1 E. | R. 2 E.

2 060 000 FEET

(Joins sheet 92) | (sh 93)

(Joins sheet 99)

T. 1 S.

20 000 FEET

10 000 FEET

2 040 000 FEET

(Joins sheet 101)

1 Mile

5000 Feet

Scale · 1 : 20000

MnA MnB MoA Ga Nd Nw MdA MrA Lc

4 3 2 1 9 10 11 12 13 14 38 39 40 41 48 21

Bayou Boeuf

Morgan Bayou

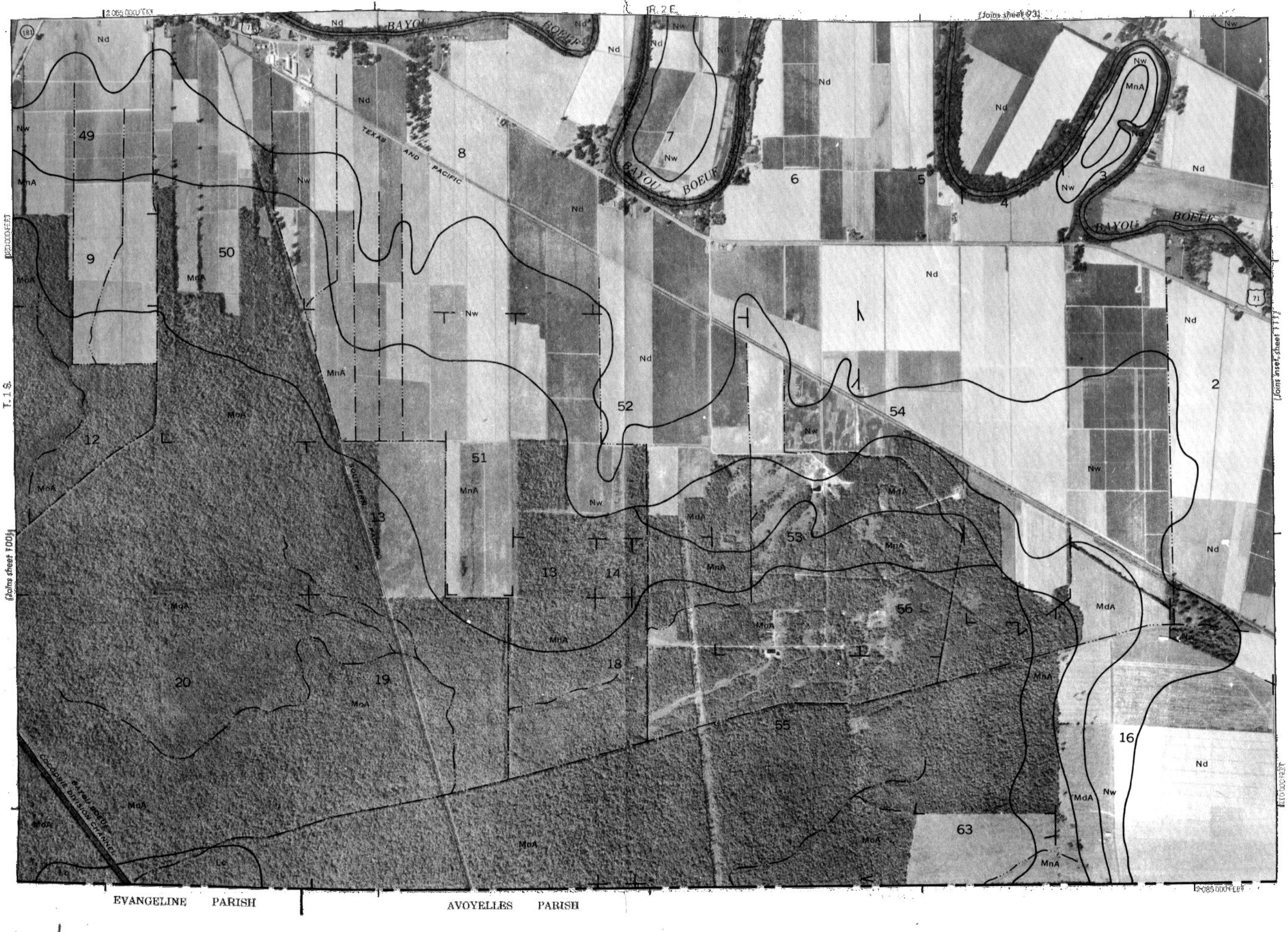
Bayou Cocodrie

McInnish

COCODRIE DIVERSION CHANNEL

EVANGELINE PARISH

RAPIDES PARISH, LOUISIANA



102

N

Scale 1:20000

1 Mile 5000 Feet

0 0

¼ 1000

½ 2000

¾ 3000

1 4000

5000

(Joins sheet 94)

R. 4 W.

1 915 000 FEET

T. 1 S.

(Joins sheet 103)

1 905 000 FEET

1 895 000 FEET

1 900 000 FEET

(Joins sheet 107)

VERNON PARISH

Temple Creek

Steep Gully Branch

Cherrywinche Creek

Bad Gully

Plainview Lookout Tower

19 20 21 22 27 28 29 30 31 32 33 34

BeB MaC RsB RsC ChB Ca Gy Wr VWD EuE AcB

RAPIDES PARISH, LOUISIANA

1 920 000 FEET

R. 4 W. | R. 3 W.

(Joins sheet 95)

103

N

105 000 FEET

T. 1 S.

(Joins sheet 102)

(Joins sheet 104)

1 Mile

5000 Feet

Scale 1:20000

Cherryvinche Creek

Bad Gully

CALCASIEU RIVER

(Joins sheet 108)

1 940 000 FEET

104

N

1 Mile
5000 Feet
Scale · 1:20000
0 0
1/4 1000
1/2 2000
3/4 4000
1 5000

(Joins sheet 96)

R. 3 W. | R. 2 W.

1 965 000 FEET

1 945 000 FEET

(Joins sheet 103)

(Joins sheet 105)

(Joins sheet 109)

T. 1 S.

Calcasieu River

Masters Creek

CASCASIEU RIVER

21 22 23 24 19
28 27 26 25 30
33 34 35 36 31

Gy ChB BeB Ca MaC KnB AcB Wr GoB AcA QtO

GrC

165

165A

N

1 970 000 FEET

R. 2 W.

(Joins sheet 97)

105 000 FEET

T. 1 S.

(Joins sheet 106)

(Joins sheet 104)

95 000 FEET

1 990 000 FEET

(Joins sheet 110)

1 Mile

5000 Feet

Scale 1:20000

0 1000 2000 3000 4000 5000

¼ ½ ¾ 1

106

N

R. 2 W. | R. 1 W.

(Joins sheet 98)

2 015 000 FEET

105 000 FEET

T. 2 S.

Bennett Bay

Bennett Bay Landing

Hester Landing

Dove Landing

COCODRIE LAKE

EVANGELINE PARISH

Clear Creek

Diana Branch

Horse Branch

Bayou Cocodrie

19 20 24 25 29 30 31 32 36

(Joins sheet 105)

1 995 000 FEET

(Joins sheet 111)

1 Mile

5000 Feet

Scale 1:20000

1000 2000 3000 4000 5000

1 900 000 FEET

R. 4 W.

(Joins sheet 102)

90 000 FEET

T. 2 S.

VERNON PARISH

Territile Creek

water

Cow Bayou

(112)

(Joins sheet 108)

ALLEN PARISH

1 915 000 FEET

80 000 FEET

N

1 Mile

5000 Feet

Scale 1:20000

1 0 1 2 3 4 5000

¾ ½ ¼ 0 0 ¼ ½ ¾ 1

1000 2000 3000 4000

RAPIDES PARISH, LOUISIANA — SHEET NUMBER 108

108

N

1 Mile

5000 Feet

Scale · 1 : 20000

(Joins sheet 103)

R. 4 W. | R. 3 W.

1 940 000 FEET

(Joins sheet 107)

(Joins sheet 109)

T. 2 S.

80 000 FEET

1 920 000 FEET

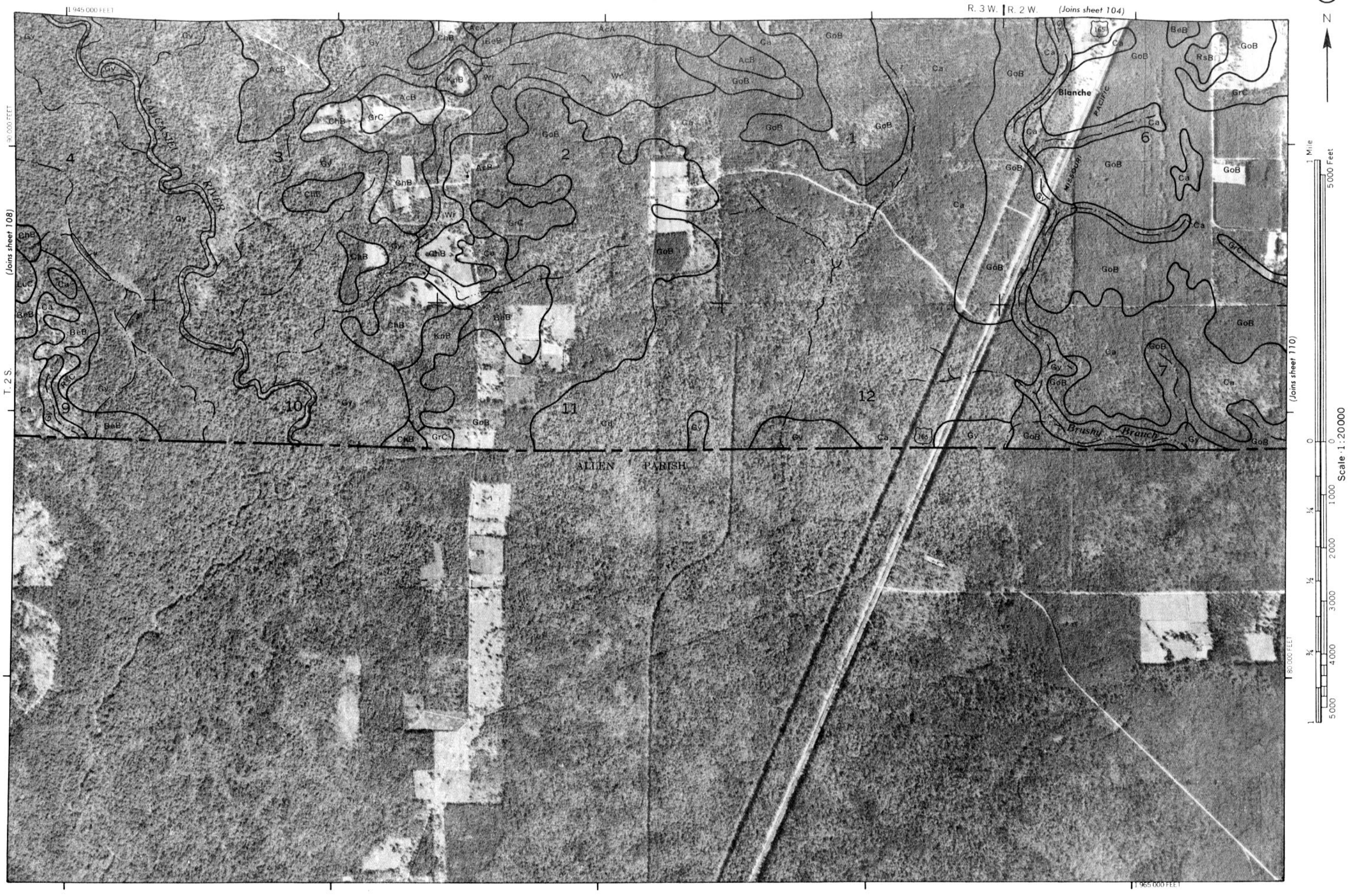
ALLEN PARISH

Bad Gully

Cherrytinche Creek

Cow Bayou

MaC BeB Ca RsB RsC LuC Gy ChB Wr ArB


1 945 000 FEET
R. 3 W.
R. 2 W.
(Joins sheet 104)
(Joins sheet 108)
(Joins sheet 110)
T. 2 S.
N
CALCASIEU RIVER
Blanche
MISSOURI PACIFIC
Brushy Branch
ALLEN PARISH
1
2
3
4
6
7
9
10
11
12
Gy
AcB
AcA
ChB
BeB
KnB
Wr
GrC
GoB
Ca
RsB
LuC
1 965 000 FEET
1 Mile
5000 Feet
Scale 1:20000

11

N

2 040 000 FEET

280 000 FEET

R. 1 E. | R. 2 E.

(Joins inset, sheet 9)

T. 5 N.

(Joins sheet 10)

(Joins sheet 12)

(Joins sheet 21)

2 060 000 FEET

GRANT P. INDEFINITE BOUNDARY

CAMP BEAUREGARD

KISATCHIE NATIONAL FOREST

Sand and Gravel Pit

Little Creek

Bennet Creek

Borrow Area

1 Mile

5000 Feet

Scale 1:20000

110

N

1 Mile
5000 Feet
0
1:20000
0
Scale · 1 : 20000
1
5000
½
1000
1
2000
1½
3000
2
4000
2½
5000

(Joins sheet 105)

R. 2 W.

1 990 000 FEET

90 000 FEET

80 000 FEET

1 970 000 FEET

(Joins sheet 109)

(Joins sheet 111)

T. 2 S.

ALLEN PARISH

EVANGELINE PARISH

Landing Strip

Bayou Cocodrie

Lang Branch

McKemy Branch

Bayou Cocodrie

GoB GrC GrD RsC RsB MaC BeB Gy Ca Wr AcA AcB ChB KnB

1 2 3 4 5 6 7 8 9 10 11 12

R. 2 W. | R. 1 W.

1 995 000 FEET

(Joins sheet 106)

90 000 FEET

T. 2 S.

(Joins sheet 110)

80 000 FEET

2 005 000 FEET

2 087 000 FEET

(Joins sheet 61)

120 000 FEET

T. 1 S.

(Joins sheet 101)

110 000 FEET

2 092 000 FEET

EVANGELINE PARISH

AVOYELLES PARISH

Horse Branch

Dimond Branch

Cocodrie Bayou

BAYOU BOEUF

TEXAS AND PACIFIC

111

N

1 Mile

5 000 Feet

Scale 1:20000

12

N

(Joins sheet 4)

R. 2 E.

2,085,000 FEET

T. 5 N.

(Joins sheet 13)

2,080,000 FEET

(Joins sheet 11)

2,070,000 FEET

2,065,000 FEET

(Joins sheet 22)

1 Mile

5000 Feet

Scale 1:20000

CAMP BEAUREGARD

Flagpole

Sand and Gravel Pit

Dry Creek

Bayou

water

Clear

RsB RsC CeE MaC Gy CeC BeB BeE SmE Ur GrC AcB KnB GrD Wr AcA McD AL McC GrD Re LsB ChB Pa

RAPIDES PARISH, LOUISIANA

13

R. 2 E. | R. 3 E.

2 090 000 FEET

(Joins sheet 5)

N

T. 5 N.

290 000 FEET

Catahoula Lake

Clear Bayou

LA SALLE PARISH

BIG

SALINE BAYOU

Waters Bayou

water

(Joins sheet 12)

270 000 FEET

2 110 000 FEET

(Joins sheet 23)

1 Mile

5000 Feet

Scale 1:20000

RAPIDES PARISH, LOUISIANA — SHEET NUMBER 14

14

N

R. 5 W.

(Joins sheet 6)

1 895 000 FEET

265 000 FEET

T. 5 N.

NATCHITOCHES PARISH

Flatwoods

Pine Coupee

Pine Coupee

Bayou

Siegen Creek

water

(Joins sheet 25) | (Joins inset, sheet 6)

1 875 000 FEET

(Joins sheet 26)

(Joins sheet 15)

Scale 1:20000

1 Mile

5000 Feet


1 900 000 FEET
R. 4 W.
(Joins sheet 7)
T. 5 N.
265 000 FEET
Campbell
Bayou Castor
Sharp
water
LAKE RODEMACHER
Spoil Area
Horn Spring Branch
Campbell Creek
Ca Creek
Odom Creek
19
20
21
22
23
28
29
30
31
32
33
34
35
27
26
(Joins sheet 16)
(Joins sheet 14)
(Joins sheet 27)
1 920 000 FEET
N
1 Mile
5000 Feet
Scale 1:20000

N

R. 4 W. | R. 3 W.

T. 5 N.

1 940 000 FEET

265 000 FEET

255 000 FEET

1 925 000 FEET

1 Mile

5000 Feet

Scale 1:20000

0 0 ¼ 1000 ½ 2000 ¾ 4000 1 5000

(Joins sheet 8)

(Joins sheet 15)

(Joins sheet 17)

(Joins sheet 28)

LAKE

RODEMACHER

GRANT PARISH

RED RIVER

Sand and Gravel Pit

Power Plant

Spoil Area

Borrow Area

Bayou Jean

Bayou Cocodrie

Bayou Bertrand

water

N

1 945 000 FEET

R. 3 W. | R. 2 W.

1 265 000 FEET

T. 5 N.

GRANT PARISH

RED RIVER

INDEFINITE BOUNDARY

Boyce

Alfalla

Bayou Bertrand

Turkey Bayou

Sandy Bayou

water (Sewage Lagoon)

water

TEXAS AND PACIFIC

Rr RnB MdA Nd MnA Nw Lc

1200

(Joins sheet 16)

(Joins sheet 18)

(Joins sheet 29)

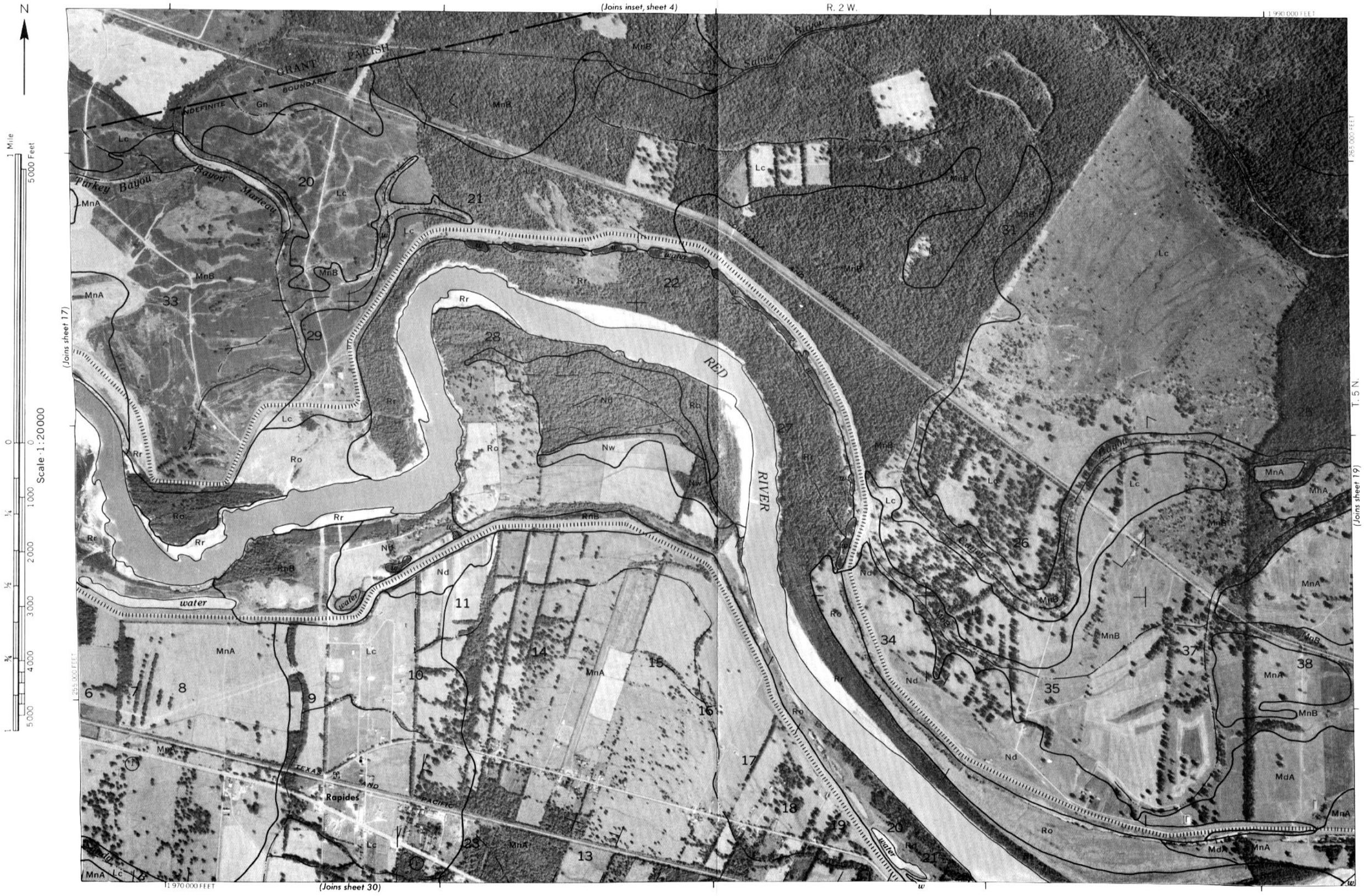
1 965 000 FEET

1 265 000 FEET

1 Mile

5000 Feet

Scale 1:20000


N
1 Mile
5000 Feet
Scale 1:20000
(Joins inset, sheet 4)
R. 2 W.
1 990 000 FEET
265 000 FEET
T. 5 N.
GRANT PARISH
BOUNDARY
INDEFINITE
Gn
Lc
MnB
MnA
Nd
Nw
Ro
Rr
RnB
MdA
Turkey Bayou
Bayou Martegay
Saline Bayou
RED RIVER
water
Rapides
TEXAS AND PACIFIC
(Joins sheet 17)
(Joins sheet 19)
(Joins sheet 30)
1 970 000 FEET
295 000 FEET

R. 2 W. | R. 1 W.

1 995 000 FEET

T. 5 N.

265 000 FEET

(Joins sheet 18)

(Joins sheet 9)

(Joins sheet 20)

(Joins sheet 31)

2 015 000 FEET

N

1 Mile

5000 Feet

Scale 1:20000

Cocklebur Bayou

Caney Bayou

BAYOU RIGOLETTE

LOUISIANA AND ARKANSAS Barrett

RED RIVER

water

water (Seward Lagoon)

Le Lc Gu Gy SmE LuC RsB MaC EuE ChB MnA MnB GrC GrD LsB CeC Ca Ga Nd Nw Ro Gn KnB AcB BeB CeE MdA

RAPIDES PARISH, LOUISIANA — SHEET NUMBER 2

(2)

N

1 Mile
5000 Feet
0
Scale 1:20000
1000
2000
3000
4000
5000

R. 4 W.

(Joins sh 1)

11 920 000 FEET

T. 6 N.

(Joins sheet 3)

NATCHITOCHES PARISH

Davis Creek

Texas

Cherry Creek

Pacific

Lena

AnB
BeB
CeC
Ca
Gy
KCE
MaC
VWD

23
26
27
28
32
33
34
35
51
53

1 900 000 FEET

(Joins sheet 7)

RAPIDES PARISH, LOUISIANA — SHEET NUMBER 20

20

N

R. 1 W. | R. 1 E.

T. 5 N.

(Joins sheet 10)

(Joins sheet 19)

(Joins sheet 21)

(Joins sheet 32)

2 035 000 FEET

2 020 000 FEET

255 000 FEET

Scale 1:20000

1 Mile

5000 Feet

Tioga

Lee Heights

Kingsville

Paradise

CAMP BEAUREGARD

Sand and Gravel Pit

water (Sewage Lagoon)

water

Louisiana & Arkansas Railway

Missouri Pacific

Bayou

Creek

FOREST BOUNDARY

N

R. 1 E. R. 2 E.

T. 5 N.

2 040 000 FEET

265 000 FEET

(Joins sheet 11)

(Joins sheet 22)

(Joins sheet 20)

(Joins sheet 33)

2 060 000 FEET

255 000 FEET

CAMP BEAUREGARD

ESLER FIELD

Borrow Area

Sand and Gravel Pit

Sand and Gravel Pit

water

water

(Sewage Lagoon)

Green Gables

Little Beaver Creek

Beaver Creek

Mill Creek

Flagon Bayou

Dyson Creek

Lookout Tower

1 Mile

5000 Feet

Scale 1:20000

RAPIDES PARISH, LOUISIANA — SHEET NUMBER 22

22

N

1 Mile

5000 Feet

Scale 1:20000

(Joins sheet 12)

R. 2 E.

11

2 085 000 FEET

255 000 FEET

T. 5 N.

(Joins sheet 23)

(Joins sheet 21)

2 065 000 FEET

(Joins sheet 34)

ESLER FIELD

Borrow Area

Bayou Flagon

Sand and Gravel Pit

Holloway

Slash Creek

Dyson

Little Prairie

R. 2 E. | R. 3 E.

2 090 000 FEET

(Joins sheet 13)

N

1 Mile

5000 Feet

Scale · 1:20000

T. 5 N.

265 000 FEET

(Joins sheet 22)

(Joins sheet 24)

255 000 FEET

2 110 000 FEET

(Joins sheet 35)

Water Bayou

Bayou Slash

Buckeye

Island Bayou

Pa Cr Mw Wr AcA KnB GrC Fo AcB GrD LsB

24

N

R. 3 E. | R. 4 E.

2 130 000 FEET

2 110 000 FEET

2 105 000 FEET

2 115 000 FEET

T. 5 N.

T. 4 N.

1 Mile

5 000 Feet

Scale 1:20000

(Joins sheet 23)

(Joins sheet 35)

(Joins inset, sheet 5)

(Joins sheet 36)

BIG AVOYELLES PARISH CREEK

LASALLE PARISH SALINE BAYOU

Bayou Jean

Fo GrC GrD KnB LsB AcB AcA Wr Gy Pe

25

N

Scale 1:20000

1 Mile 0 ¼ ½ ¾ 1

5000 4000 3000 2000 1000 0 5000 Feet

(Joins inset, sheet 6)

(Joins sheet 26)

(Joins sheet 14)

240 000 FEET

1 870 000 FEET

R. 6 W. | R. 5 W.

T. 4 N. | T. 5 N.

1 860 000 FEET

259 000 FEET

NATCHITOCHES PARISH

VERNON PARISH

Spanish Branch

Devils Creek

Marl Gum Branch

Devils Creek

Hanis Cr.

31 32 5 6 36 1 8 7 18 17 12 11 10

26

N

(Joins sheet 14)

R. 5 W.

895 000 FEET

T. 4 N.

250 000 FEET

(Joins sheet 25)

(Joins sheet 27)

240 000 FEET

1 875 000 FEET

(Joins sheet 37)

1 Mile

5000 Feet

Scale 1:20000

Bayou Branch

Spanish Pond Coulee

Zimmerman Camp

Dents Creek

Odom Creek

Sleper Creek

VERNON PARISH

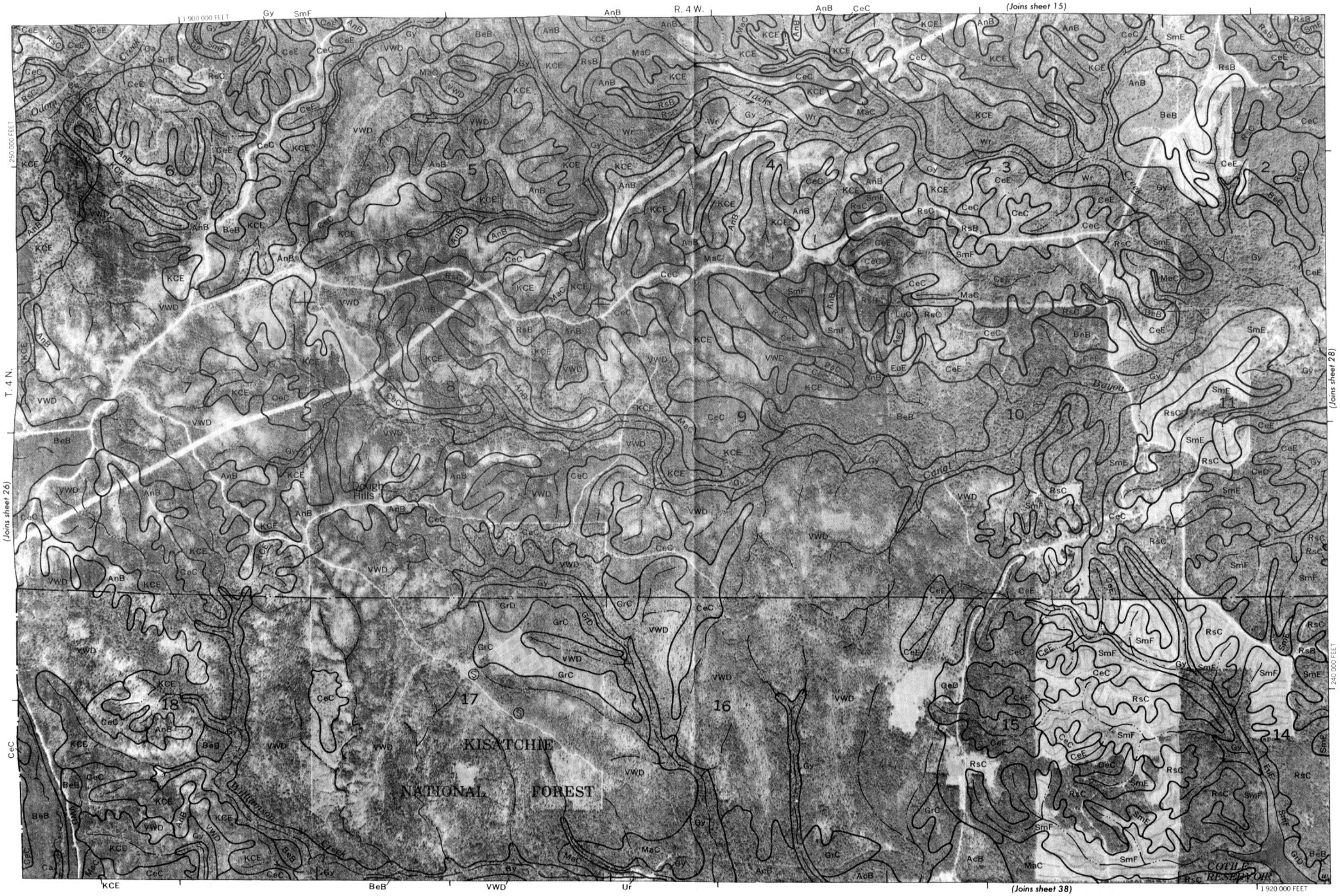
FOREST BOUNDARY

5 4 3 2 1

8 9 10 11 12

17 16 15 14 13

BeB Ca CeC MaC RsC RsB KCE AnB CeE Gy LuC AsC VWD Wr


1 900 000 FEET
R. 4 W.
(Joins sheet 15)
250 000 FEET
T. 4 N.
(Joins sheet 26)
(Joins sheet 28)
240 000 FEET
1 920 000 FEET
(Joins sheet 38)
KISATCHIE
NATIONAL FOREST
Dough Hills
COTILE RESERVOIR
Odom Creek
Jacks Creek
Bayou Cargal
Williamson Branch
N
1 Mile
5 000 Feet
Scale 1:20000

N

(Joins sheet 16)

R. 4 W. | R. 3 W.

1 945 000 FEET

250 000 FEET

T. 4 N.

1 Mile

5000 Feet

Scale 1:20000

(Joins sheet 27)

(Joins sheet 29)

1 925 000 FEET

(Joins sheet 39)

Sand and Gravel Pit

Creek

Jacks

Bayou Jean de Jean

Bayou Cocodrie

Hotwells

BAYOU RAPIDES

COTILE RESERVOIR

KISATCHIE NATIONAL FOREST


R.3W.
R.2W.
(Joins sheet 17)
T.4N.
(Joins sheet 28)
(Joins sheet 30)
(Joins sheet 40)
BAYOU RAPIDES
Bayou Cocodrie
Bayou Bertrand
Bayou Saline
Hunter Lake
McNutt
Birch
MnA
MdA
Nd
Nw
Lc
Ga
Pe
Gn
Ga
1 Mile
5000 Feet


N
Scale 1:20000
1 Mile
5000 Feet
RED RIVER
GRANT PARISH
NEW CANE RIVER
Davis Creek
Shaw Creek
R. 4 W.
R. 3 W.
T. 6 N.
(Joins sheet 1)
(Joins sheet 2)
(Joins sheet 8)
1 925 000 FEET
1 940 000 FEET
285 000 FEET
295 000 FEET

RAPIDES PARISH, LOUISIANA — SHEET NUMBER 30

30

N

1 Mile

5000 Feet

Scale 1:20000

(Joins sheet 18)

R. 2 W.

1 990 000 FEET

250 000 FEET

T. 4 N.

32

(Joins sheet 29)

(Joins sheet 31)

240 000 FEET

1 970 000 FEET

(Joins sheet 41)

Sandy Bayou

RED RIVER

TEXAS AND PACIFIC RnB

Golf Course

water

(Sewage Lagoon)

ENGLAND AIR FORCE BASE

RAPIDES

1202

MnA MnB Mn Lc Nw Nd Ro Rr RnB w

R. 2 W. | R. 1 W. | 1 995 000 FEET

(Joins sheet 19)

T. 4 N.

(Joins sheet 30)

(Joins sheet 32)

(Joins sheet 42)

250 000 FEET

240 000 FEET

2 015 000 FEET

N

1 Mile

5 000 Feet

Scale · 1:20000

RED RIVER

BAYOU RAPIDES

LAKE BUHLOW

LOUISIANA AND ARKANSAS

TEXAS AND LOUISIANA

ARKANSAS AND LOUISIANA

ENGLAND AIR FORCE BASE

ALEXANDRIA

(Parish Seat)

(Savage Lagoon)

water

Nd Rr Ro Gn MnA MnB AcA La KnB GrC AcB Nw Lc RnB

N

Scale · 1:20000

1 Mile · 5000 Feet

R. 1 W. | R. 1 E.

T. 4 N.

2 035 000 FEET

250 000 FEET

240 000 FEET

2 020 000 FEET

(Joins sheet 20)

(Joins sheet 31)

(Joins sheet 33)

(Joins sheet 43)

ALEXANDRIA-PINEVILLE AIRPORT

LAKE BUHLOW

CENTRAL LOUISIANA STATE HOSPITAL

LOUISIANA COLLEGE

PINEVILLE

Pierson Lake

(Sewage Lagoon)

Mollin

ARKANSAS

LOUISIANA

RED RIVER

Bayou Maria Basin

Golf Course

water

Soil types: AcA, AcB, BeB, CeC, EnE, GrC, GrD, Gy, KnB, MaC, MnA, RsB, RsC, Re, Wr

N

2 040 000 FEET

R. 1 E. | R. 2 E.

(Joins sheet 21)

T. 4 N.

Sand and Gravel Pit

Libuse

Fork

Black Branch

(Joins sheet 32)

(Joins sheet 34)

(Joins sheet 44)

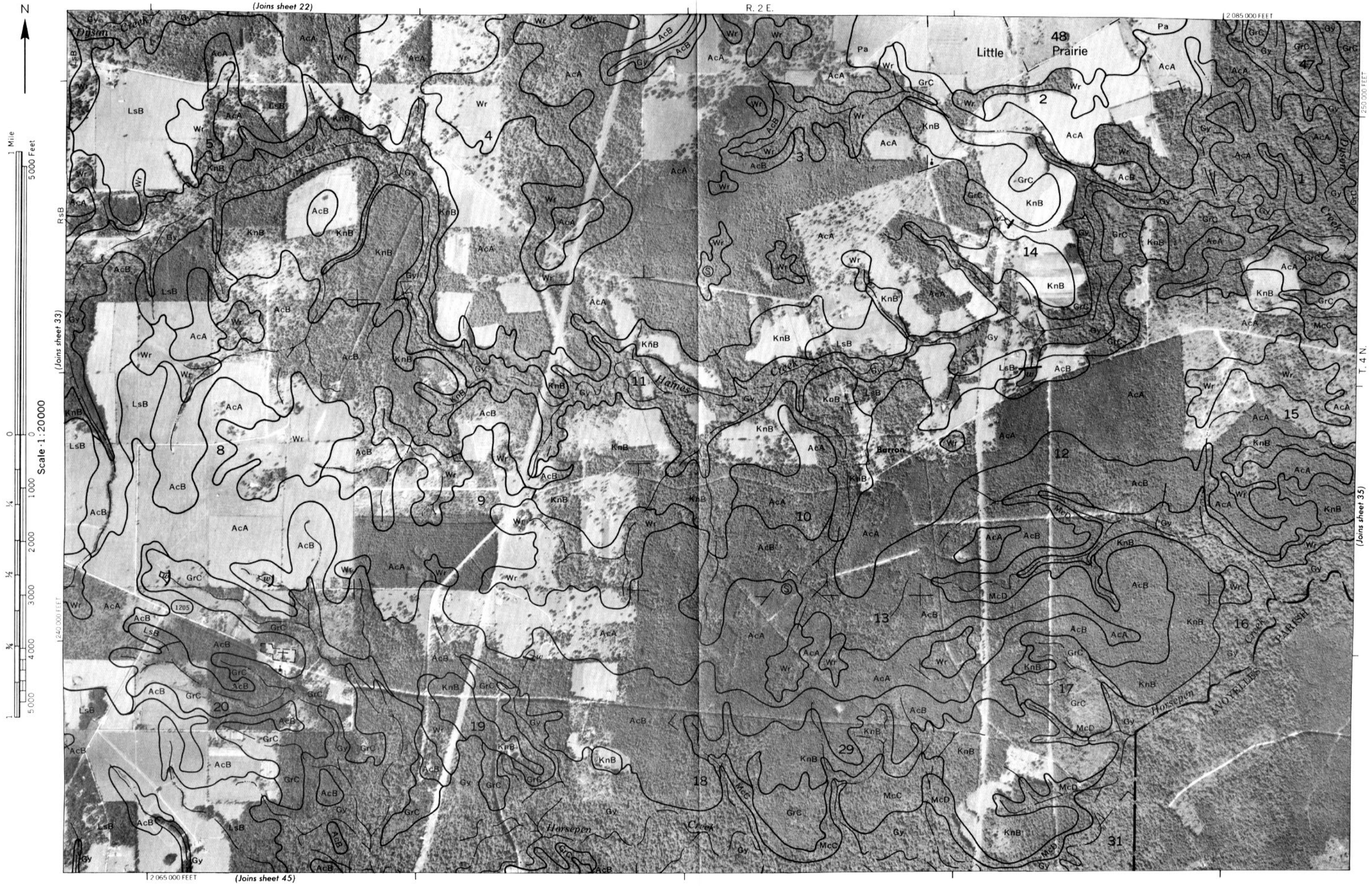
29

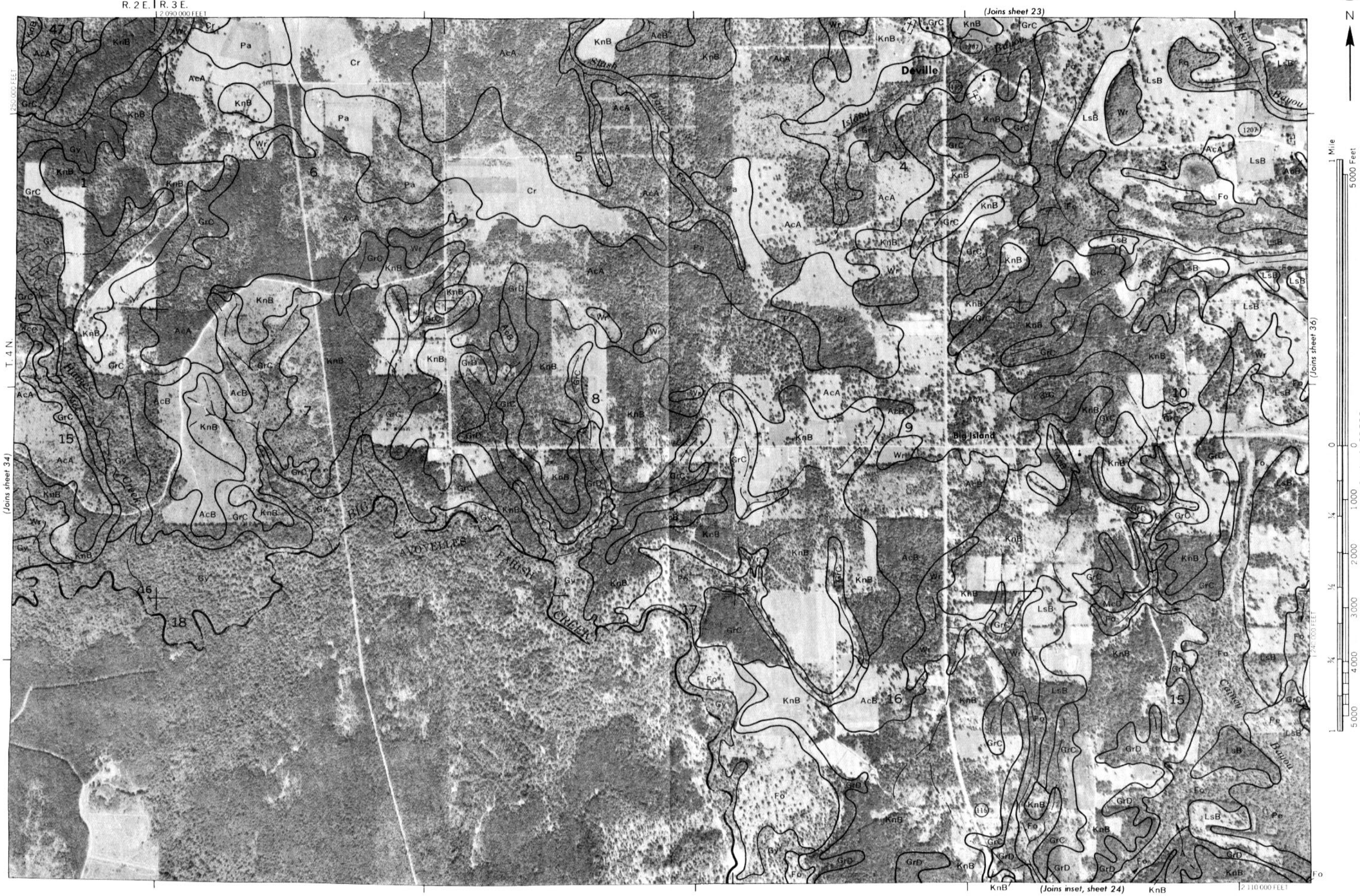
2 060 000 FEET

1 Mile

5000 Feet

Scale 1:20000


N
(Joins sheet 22)
R. 2 E.
2 085 000 FEET
250 000 FEET
T. 4 N.
(Joins sheet 33)
(Joins sheet 35)
(Joins sheet 45)
2 065 000 FEET
240 000 FEET
1 Mile
5000 Feet
Scale · 1 : 20000
Dyson Creek
Little Prairie
Hames Creek
Barron
Horsepen Creek
AVOYELLES PARISH
LsB
AcA
AcB
KnB
GrC
Gy
Wr
Pa
McC
McD
1205


R. 2 E. | R. 3 E.
2 090 000 FEET
(Joins sheet 23)
N
250 000 FEET
T. 4 N.
(Joins sheet 34)
(Joins sheet 36)
(Joins inset, sheet 24)
2 110 000 FEET
Deville
Big Island
Slash Bayou
Island Bayou
Bayou
Hunter Creek
BIG AVOYELLES Parish CREEK
Cantou Bayou
1 Mile
5 000 Feet
Scale 1:20000
0
¼
½
¾
1
1000
2000
3000
4000
5000
AcA
AcB
Cr
Pa
KnB
GrC
GrD
Gy
Wr
LsB
Fo
Pe
McD


N
1 Mile
5000 Feet
Scale · 1 : 20000
(Joins sheet 24)
R. 3 E.
R. 4 E.
2 130 000 FEET
250 000 FEET
(Joins sheet 35)
T. 4 N.
240 000 FEET
2 115 000 FEET
(Joins inset, sheet 5)
Bayou Island
water
Open Bayou
SALINE LAKE
BIG SALINE BAYOU
LA SALLE PARISH
AVOYELLES PARISH
BIG CREEK
Camels Slough
Cathey Bayou
BIG ISLAND
1207
LsB
Wr
GrC
KnB
Fo
GrD
AcB
Fd
Pe
Eg

1 875 000 FEET

235 000 FEET

R. 5 W.

(Joins sheet 26)

1 892 000 FEET

220 000 FEET

R. 5 W.

(Joins lower right)

T. 3 N.

(Joins sheet 46)

215 000 FEET

1 897 000 FEET

VERNON PARISH

Clifton

Comrade Creek

Stamer Creek

BOUNDARY

FOREST

T. 4 N.

(Joins sheet 38)

225 000 FEET

(Joins inset)

1 895 000 FEET

N

1 Mile

5000 Feet

Scale 1:20000

38

N

1 Mile
5000 Feet

Scale 1:20000

R. 4 W.

T. 4 N.

(Joins sheet 27)

(Joins sheet 37)

(Joins sheet 39)

(Joins sheet 46)

1 920 000 FEET

1 900 000 FEET

Williamson Creek

Rocky Creek

Dirt Pond

Indian Creek

COTILE RESERVOIR

KISATCHIE NATIONAL FOREST

19 20 21 22 23 26 27 28 29 30 31 32 33 34 35

N

R. 4 W. | R. 3 W.

1 925 000 FEET

235 000 FEET

(Joins sheet 28)

COTILE RESERVOIR

Hunter Lake

Brown Creek Lake

Wilda

KISATCHIE NATIONAL FOREST

Hemphill Creek

Brown Branch

Williamson Branch

T. 4 N.

MaC (Joins sheet 38)

(Joins sheet 40)

225 000 FEET

1 940 000 FEET

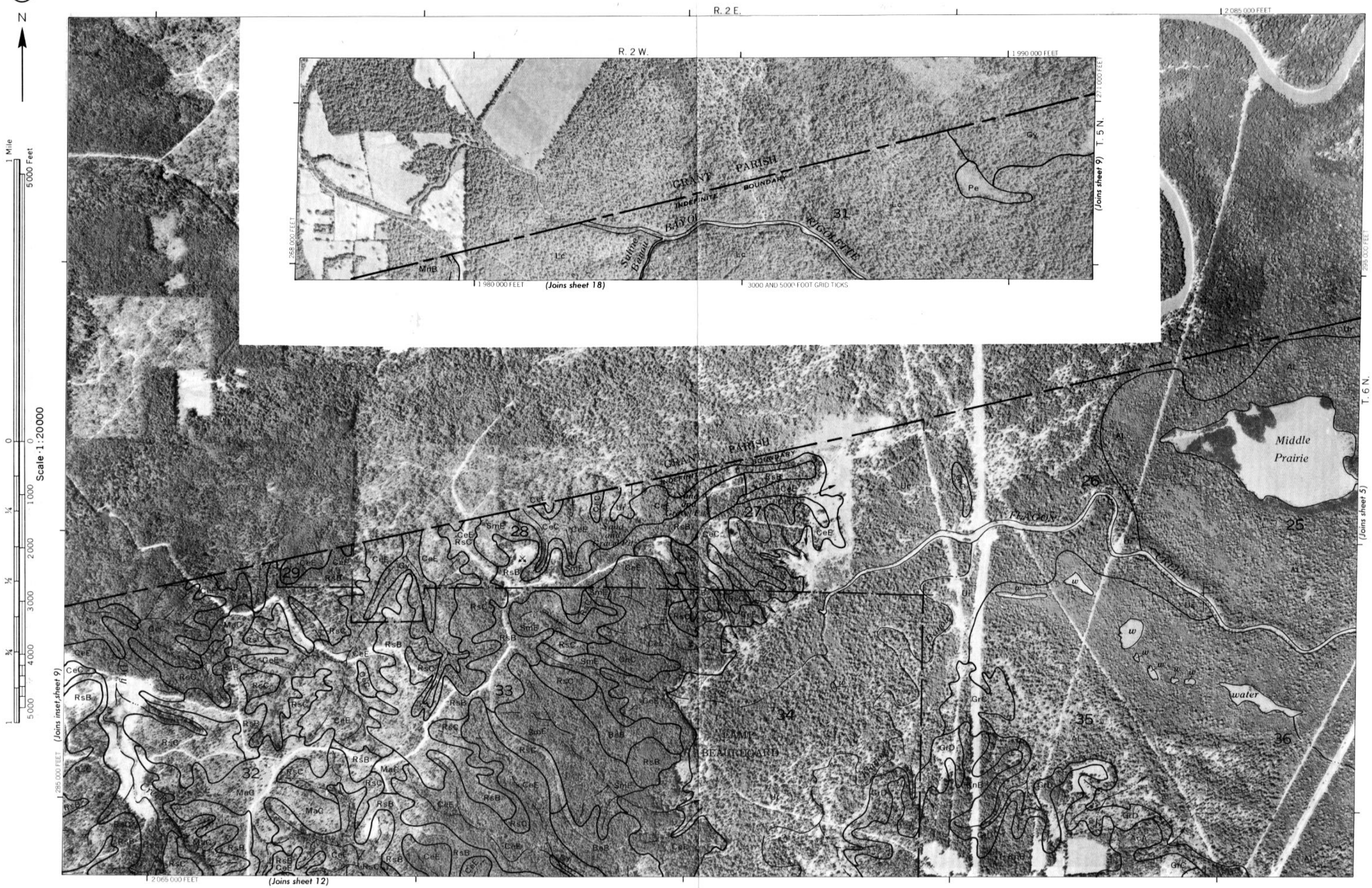
(Joins sheet 47) | (48)

1 Mile

5000 Feet

Scale 1:20000

RAPIDES PARISH, LOUISIANA — SHEET NUMBER 4



40

N

Scale 1:20000

1 Mile 5000 Feet

0 ¼ ½ ¾ 1

0 1000 2000 3000 4000 5000

(Joins sheet 29)

(Joins sheet 39)

(Joins sheet 48)

(Joins sheet 41)

1 945 000 FEET

1 965 000 FEET

225 000 FEET

235 000 FEET

R. 3 W. | R. 2 W.

T. 4 N.

Hunter Lake

McNutt

BAYOU

BAYOU

RAPIDES

BOEUF

Saline Bayou

Sibley Branch

KISATCHIE NATIONAL FOREST

KINCAID RESERVOIR

Borrow Area

Borrow Area

Pe SmE SmF LuC RsC Gy EuC EuE RsB MaC Nd MnA Ga MdA Nw GrD MsC CaC BeB Lc GeC


N
1 970 000 FEET
R. 2 W.
(Joins sheet 30)
(Joins sheet 40)
(Joins sheet 42)
(Joins sheet 49)
1 990 000 FEET
235 000 FEET
220 000 FEET
T. 4 N.
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
¼
½
¾
1
BAYOU RAPIDES
Bayou Rapides
Weil
Tiger Bayou
Persimmon Bayou
Middle Bayou
Flat Bayou
Bayou Boeuf
Bayou Boeuf
FOREST BOUNDARY
1202
496
28
Nd
Nw
Lc
MnA
MoA
MrA
Pe
EuE
RsC
SmE
w
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
51
52
53
54
55
56
57
58
59
60
61
62
63
64
68
69
77
79
83
84

42

N

R. 2 W. | R. 1 W.

(Joins sheet 31)

15

2 015 000 FEET

1 Mile

5000 Feet

Scale 1 : 20000

(Joins sheet 41)

220 000 FEET

1 995 000 FEET

(Joins sheet 50)

(Joins sheet 43)

T. 4 N.

Bayou Rapides

Rapides

RAPIDES

BAYOU

ALEXANDRIA

CHANNEL

DIVERSION

Bayou Rapides

Pecan Bayou

Bayou Darbonne

HORSESHOE DRAINAGE CANAL

TEXAS AND PACIFIC R.R.

water

Nd

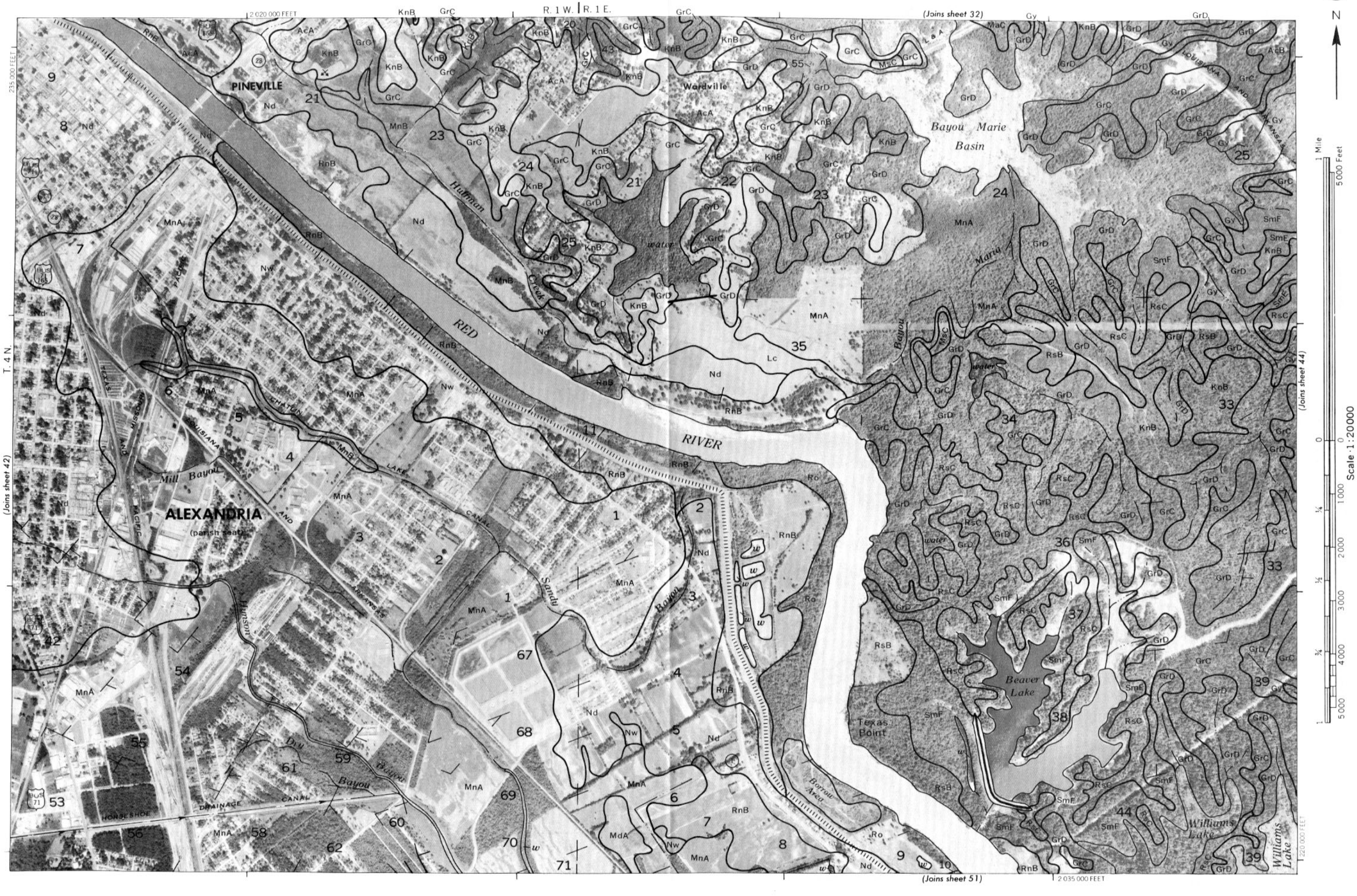
Nw

Lc

MnA

MoA

RnB


(Joins sheet 32)
(Joins sheet 42)
(Joins sheet 44)
(Joins sheet 51)
R. 1 W.
R. 1 E.
T. 4 N.
2 020 000 FEET
2 035 000 FEET
235 000 FEET
220 000 FEET
N
PINEVILLE
Wardville
ALEXANDRIA
(parish seat)
RED
RIVER
Bayou Marie Basin
Beaver Lake
Texas Point
Williams Lake
Mill Bayou
Sandy Bayou
Hurricane Creek
Borrow Area
water
1 Mile
5 000 Feet
Scale 1:20 000

N

1 Mile 5000 Feet

Scale 1:20000

0 0 ¼ 1000 ½ 2000 ¾ 4000 1 5000

(Joins sheet 43)

(Joins sheet 33)

R. 1 E. | R. 2 E.

2 060 000 FEET

235 000 FEET

T. 4 N.

(Joins sheet 45)

2 040 000 FEET

(Joins sheet 52)

Louisiana and Arkansas

Shady Oaks

Industrial Site

(Sewage Lagoon)

Williams Lake

Little Black Branch

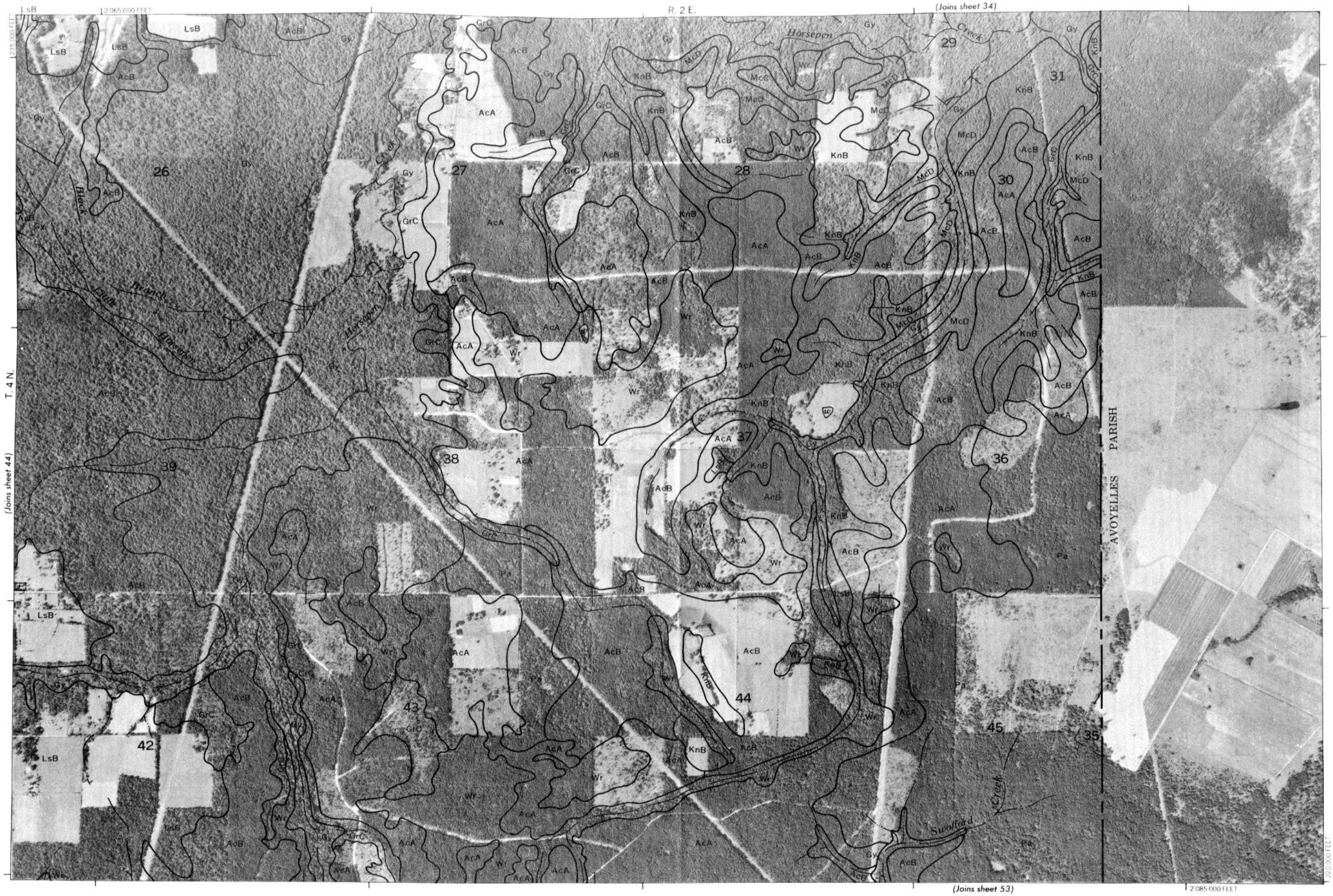
Horsepen Creek

Wiggens B

Kolin

water

25 26 27 28 29 22 23 33 32 31 30 40 39 40 41 42 41 44


LsB
2 065 000 FEET
R. 2 E.
(Joins sheet 34)
235 000 FEET
T. 4 N.
(Joins sheet 44)
N
1 Mile
5 000 Feet
Scale 1:20000
AVOYELLES PARISH
Horsepen Creek
Black Bayou
Bayou Horsepen
Swafford Creek
26
27
28
29
30
31
36
37
38
39
42
43
44
45
35
AcA
AcB
GrC
KnB
LsB
McC
McD
Gy
Wr
Pa
(Joins sheet 53)
2 085 000 FEET
220 000 FEET

46

N

1 Mile
5000 Feet
Scale 1:20000

(Joins sheet 38)

R. 4 W.

1 920 000 FEET

220 000 FEET

(Joins inset, sheet 37)

Sand and Gravel Pit

KISATCHIE NATIONAL FOREST

VERNON PARISH

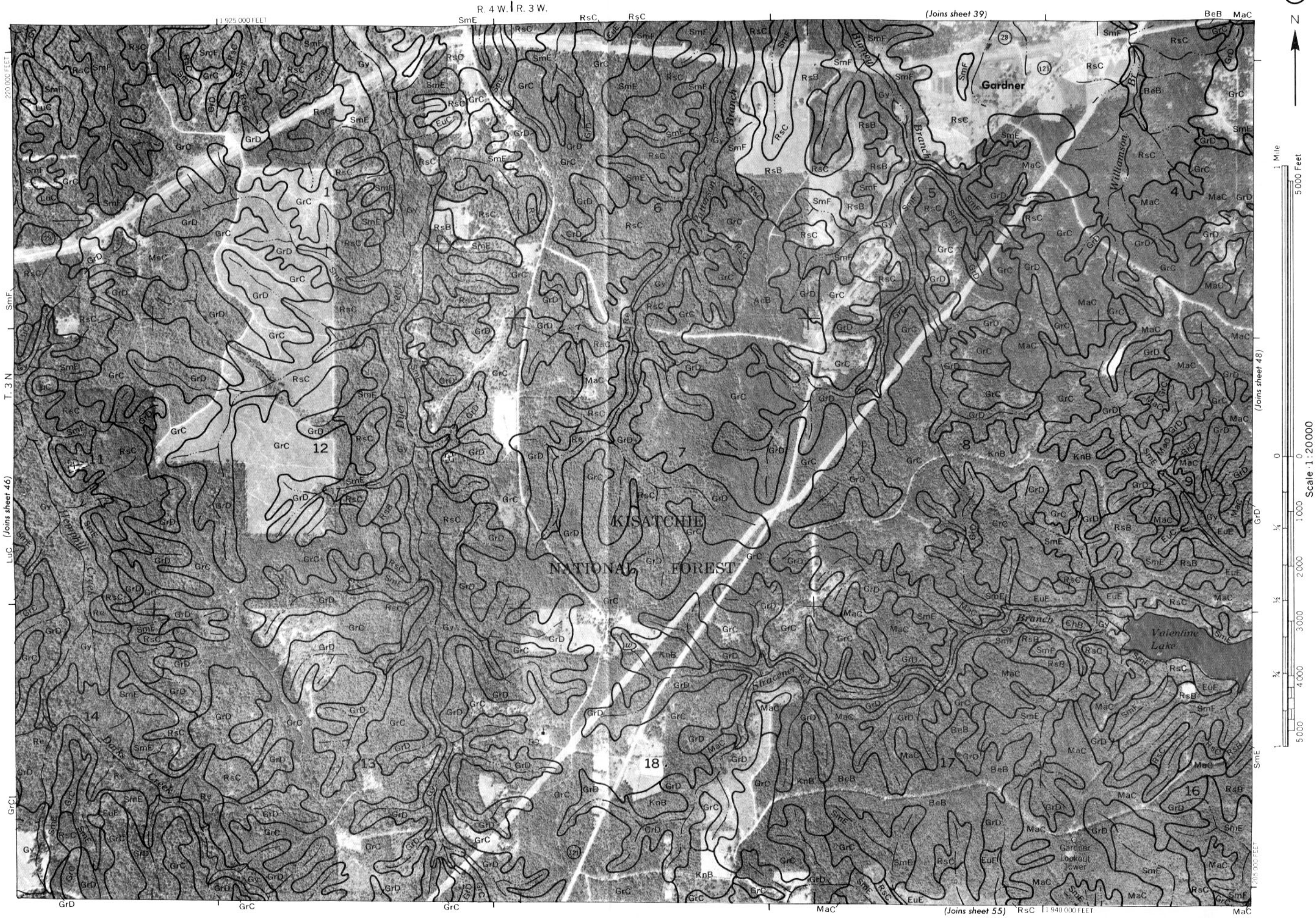
T. 3 N.

(Joins sheet 47)

205 000 FEET

1 900 000 FEET

(Joins sheet 54)


R. 4 W.
R. 3 W.
1 925 000 FEET
(Joins sheet 39)
(Joins sheet 46)
(Joins sheet 48)
(Joins sheet 55)
1 940 000 FEET
220 000 FEET
T. 3 N
N
Gardner
KISATCHIE
NATIONAL FOREST
Valentine Lake
Gardner Lookout Tower
Williamson
Branch
Dyer Creek
Hemphill Creek
Stracener Rd
1 Mile
5000 Feet
Scale 1:20000

RAPIDES PARISH, LOUISIANA — SHEET NUMBER 48

48

N

(39) (Joins sheet 40)

R. 3 W. | R. 2 W.

T. 3 N.

KINCAID RESERVOIR

KISATCHIE NATIONAL FOREST

Walker Branch

Lathe Branch

Strachener Branch

Valentine Creek

Mack Creek

Lamotte Creek

Sand and Gravel Pit

(Joins sheet 47)

(Joins sheet 49)

(Joins sheet 56)

1 Mile

5000 Feet

Scale 1:20000

1945 000 FEET

2205 000 FEET

N

R. 2 W.

T. 3 N.

1,970,000 FEET

220,000 FEET

(Joins sheet 41)

(Joins sheet 48)

(Joins sheet 50)

(Joins sheet 57)

1,990,000 FEET

265,000 FEET

KISATCHIE NATIONAL FOREST

Bayou Boeuf

Middle Bayou Grassy

Bayou Lost

Bayou Tinkey

1 Mile

5,000 Feet

Scale 1:20000

N

R. 2 E. | R. 3 E.

2 090 000 FEET

295 000 FEET

T. 6 N.

(Joins sheet 4)

GRANT PARISH

INDEFINITE BOUNDARY

LASALLE PARISH

LITTLE RIVER

Catfish Prairie

CATAHOULA LAKE

Creek

Bayou

Clear

Big

Saline

19 25 30 29 28 31 32 33 34

AL Ur GrC

(Joins sheet 13)

2 110 000 FEET

285 000 FEET

(Joins inset, sheet 24)

T. 4 N.

R. 3 E.

(Joins sheet 36)

2 115 000 FEET

285 000 FEET

282 000 FEET

2 120 000 FEET

3000 AND 5000-FOOT GRID TICKS

Pe LsB Fo GrD KnB

Carnes Bayou Big Creek

23 24

AVOYELLES PARISH

1 Mile

5 000 Feet

Scale 1:20000


R. 2 W.
R. 1 W.
(Joins sheet 42)
2 015 000 FEET
ALEXANDRIA
(parish seat)
HORSESHOE DRAINAGE CANAL
Bayou Robert
Pecan Bayou
Willow Bayou
Turkey Bayou
DIVERSION CHANNEL
Pecan Bayou
Prony
East
(Sewage Lagoons)
water
PACIFIC
MISSOURI
(Joins sheet 49)
(Joins sheet 51)
(Joins sheet 58)
T. 3 N.
215 000 FEET
205 000 FEET
1 995 000 FEET
MoA
MnA
MdA
Nd
Nw
Lc
1 Mile
5000 Feet
Scale 1:20000

N

R. 1 W. | R. 1 E.

2 020 000 FEET

T. 3 N.

215 000 FEET

(Joins sheet 43)

(Joins sheet 50)

(Joins sheet 52)

(Joins sheet 59)

2 035 000 FEET

200 000 FEET

ALEXANDRIA
(parish seat)

Williams Lake

RED RIVER

Hutson Bayou

Williams Branch

Willow Glen

Persimmon Bayou

ROBERT BAYOU

TEXAS & PACIFIC

MISSOURI PACIFIC

LOUISIANA & ARKANSAS

CHATLIN LAKE CANAL

71
167

water

MnA MnB MdA Nd Nw RnB Ro Lc GrD RsC Rr MrA SmF

1 Mile
5 000 Feet

Scale 1:20000

N

Scale 1:20000

1 Mile 0 5000 Feet

(Joins sheet 44)

R. 1 E. | R. 2 E.

2 060 000 FEET

T. 3 N.

215 000 FEET

205 000 FEET

2 040 000 FEET

(Joins sheet 51)

(Joins sheet 53)

(Joins sheet 60)

Baltonwood Lake

Rock Island Lake

Tanyard Lake

Tanyard Branch

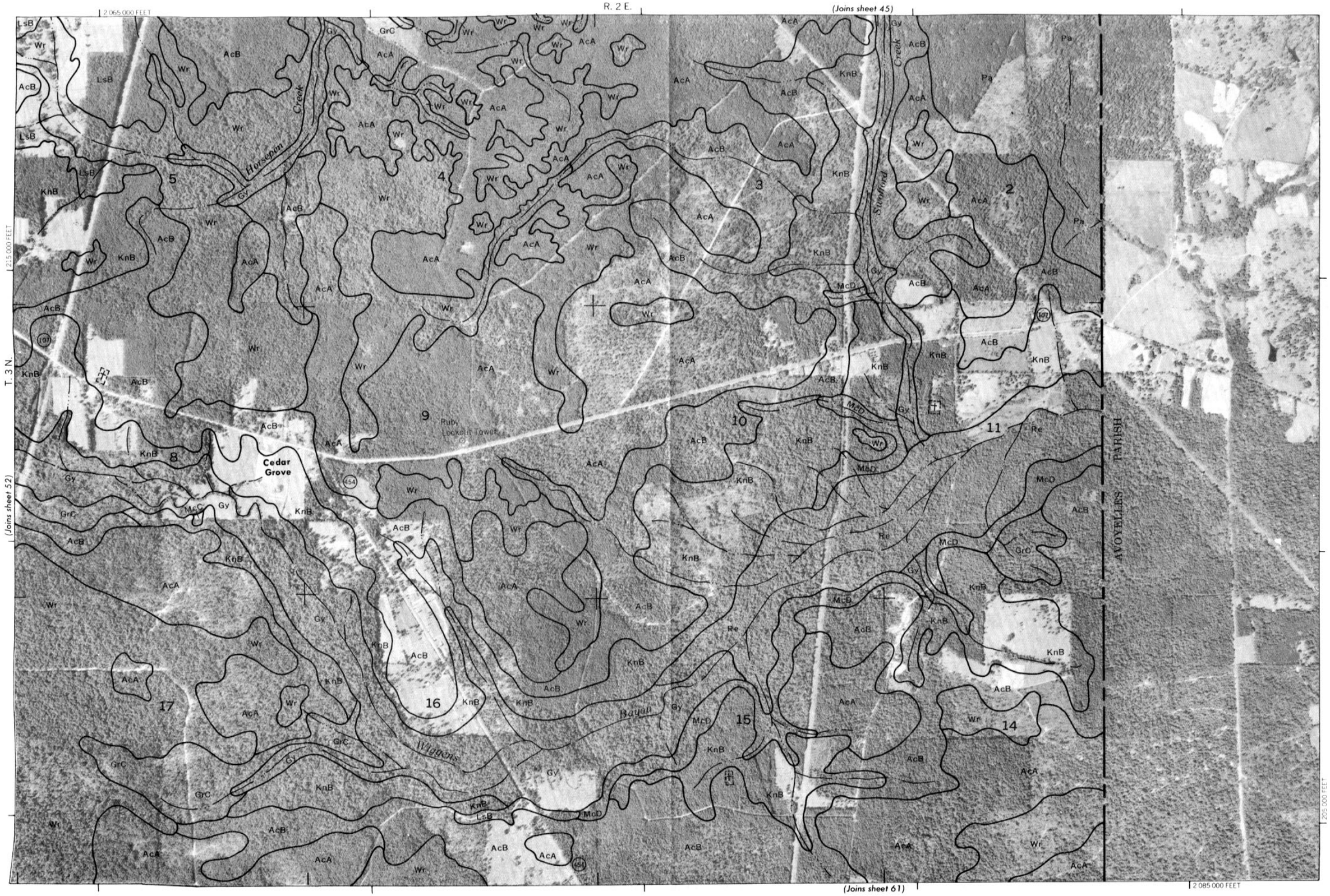
Miller Bluff

RED RIVER

Wiggins Bayou

water

GrC GrD AcB AcA KnB LsB Gy Wr RnB Rr Pe Nd SmE RsC RsB Lc Nw MdA


2 065 000 FEET
R. 2 E.
(Joins sheet 45)
215 000 FEET
T. 3 N.
(Joins sheet 52)
Horsepen Creek
Stoxford Creek
Ruby Lookout Tower
Cedar Grove
Bayou Wiggins
AVOYELLES PARISH
205 000 FEET
(Joins sheet 61)
2 085 000 FEET
N
1 Mile
5000 Feet
Scale 1:20000

54

N

R. 4 W.

T. 3 N.

(Joins sheet 46)

(Joins sheet 55)

(Joins sheet 62)

1 920 000 FEET

1 900 000 FEET

200 000 FEET

190 000 FEET

KISATCHIE NATIONAL FOREST

KISATCHIE NATIONAL FOREST BOUNDARY

VERNON PARISH

Majors Branch

Cypress Creek

Hemphill Creek

Gum Branch

Bayou Wr

CALCASIEU RIVER

Sieper

Welding

19 20 21 22 23 26 27 28 29 30 31 32 33 34 35

Scale 1:20000

1 Mile 5000 Feet

0 0

¼ 1 000

½ 2000

¾ 3000

1 4000

5 000

R. 4 W. | R. 3 W.

1 925 000 FEET

(Joins sheet 47)

T. 3 N.

200 000 FEET

(Joins sheet 54)

(Joins sheet 56)

KISATCHIE NATIONAL FOREST

1 940 000 FEET

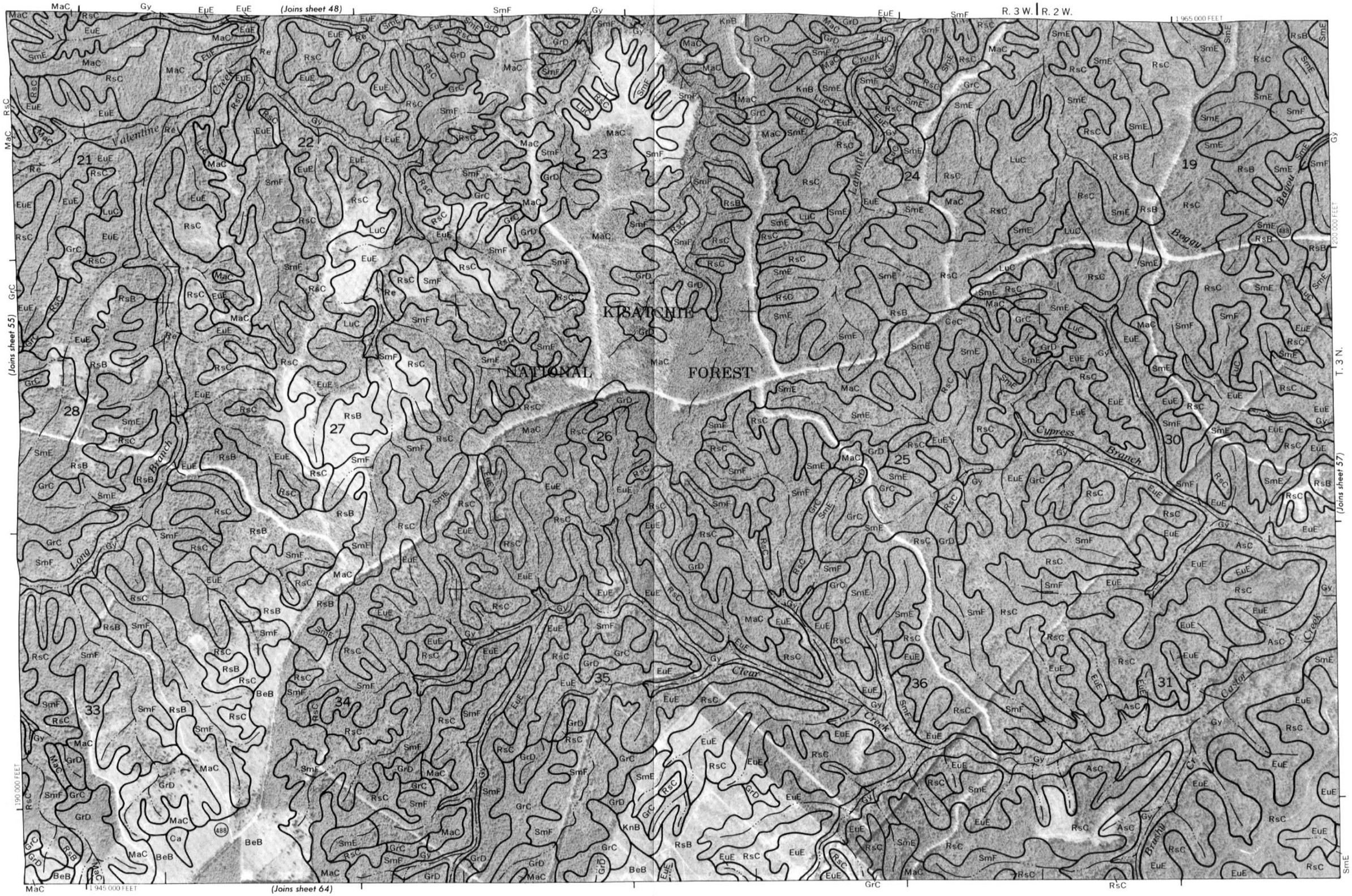
(Joins sheet 63)

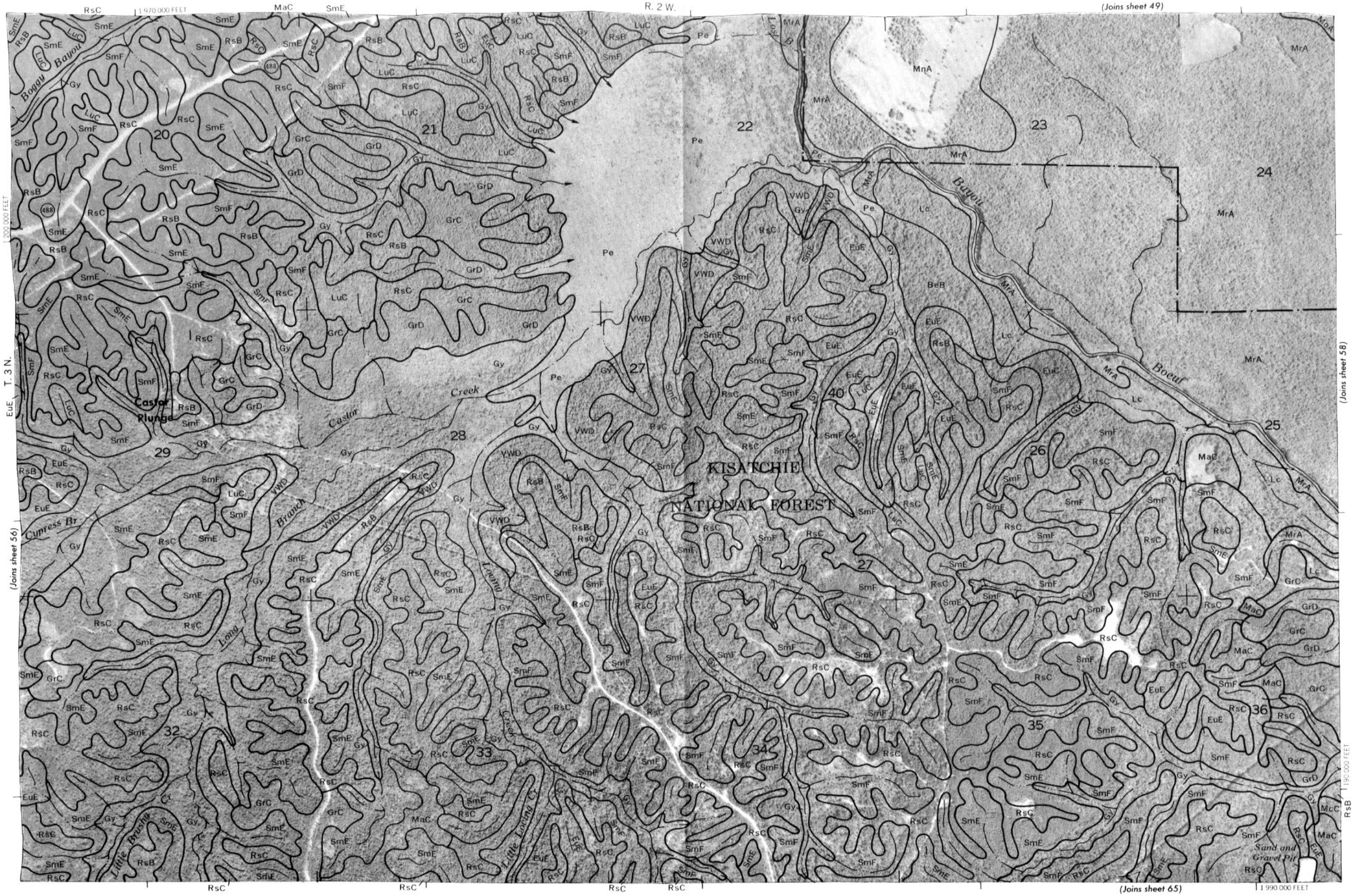
N

1 Mile

5 000 Feet

Scale 1:20000


N
R. 3 W.
R. 2 W.
T. 3 N.
1 965 000 FEET
200 000 FEET
190 000 FEET
1 945 000 FEET
(Joins sheet 48)
(Joins sheet 55)
(Joins sheet 57)
(Joins sheet 64)
KISATCHIE
NATIONAL
FOREST
Valentine Creek
Lamotte Creek
Bayou Boggy
Long Branch
Cypress Branch
Clear Creek
Castor Creek
Brushy Cr
1 Mile
5000 Feet
Scale · 1:20000


R. 2 W.
T. 3 N.
1 970 000 FEET
1 990 000 FEET
(Joins sheet 49)
(Joins sheet 56)
(Joins sheet 58)
(Joins sheet 65)
Boggy Bayou
Castor Creek
Castor Plunge
Cypress Br
Branch
Long Creek
Little Long Cr
Little Brushy Ct
Bayou Bocuf
KISATCHIE NATIONAL FOREST
Sand and Gravel Pit
20
21
22
23
24
25
26
27
28
29
32
33
34
35
36
40
RsC
SmE
SmF
LuC
GrC
GrD
Gy
Pe
VWD
MrA
MnA
MaC
EuE
BeB
Lc
RsB
McC
N
1 Mile
5000 Feet
Scale 1:20000


N
R. 2 W. R. 1 W.
(Joins sheet 50)
2 015 000 FEET
(Joins sheet 57)
(Joins sheet 59)
(Joins sheet 66)
1 995 000 FEET
190 000 FEET
200 000 FEET
T. 3 N.
KISATCHIE NATIONAL FOREST
Willow Bayou
East Prong
DIVERSION CHANNEL
MISSOURI PACIFIC
BAYOU BOEUF
Bayou
Golf Course
Cloverdale
Oden Lake
Rocky
Dry Bayou
Harris Bayou
Bench Slough
Hughes Bayou
Slough
Scale 1:20000
1 Mile
5000 Feet
0
1000
2000
3000
4000
5000

R. 1 W. | R. 1 E.

2 020 000 FEET

T. 3 N.

200 000 FEET

(Joins sheet 51)

(Joins sheet 60)

(Joins sheet 58)

(Joins sheet 67)

2 040 000 FEET

190 000 FEET

N

1 Mile

5000 Feet

Scale · 1:20000

Plantation

Bench Slough

Slough

Bayou

Chambers Lake

Hughes

Robert

Moreland

TEXAS AND PACIFIC

LOUISIANA AND ARKANSAS

CRATLIN CANAL

LAKE CANAL

71 167

6

N

1 Mile
5000 Feet
Scale · 1:20000
0 0
¼ 1000
½ 2000
¾ 3000
1 4000
5000

R. 5 W.
1 895 000 FEET
1 873 000 FEET
263 000 FEET
280 000 FEET
220 000 FEET
1 875 000 FEET
1 871 000 FEET
T. 5 N.

NATCHITOCHES PARISH

29
32
15
14
13
12

CeE CeC Gy BeB Ca MaC AnB KCE

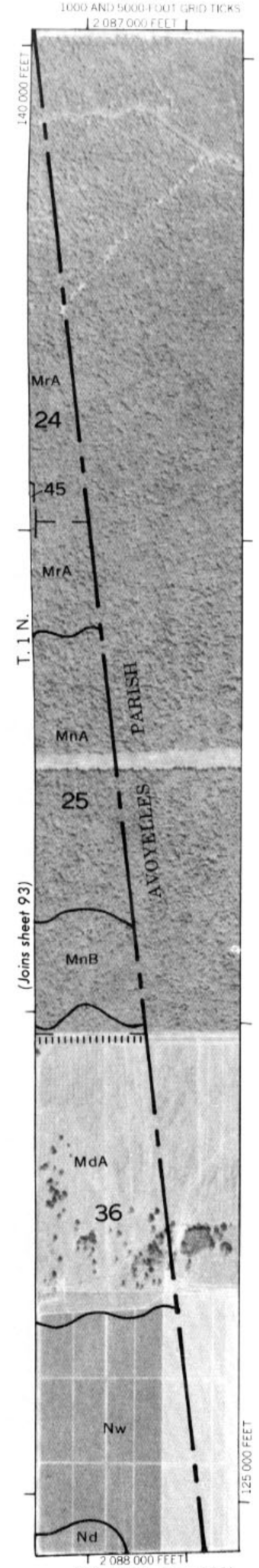
Bayou Castor

Flatwoods

(Joins sheet 14)
(Joins sheet 25)
(Joins sheet 7)
(Joins sheet 14)

2000 AND 5000-FOOT GRID TICKS


N
(Joins sheet 52)
(Joins sheet 59)
(Joins sheet 61)
(Joins sheet 68)
R. 1 E. | R. 2 E.
T. 3 N.
2 060 000 FEET
200 000 FEET
190 000 FEET
2 045 000 FEET
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
RED
RIVER
Big
Lake
Spring
Bayou
Lockhart
Lake
Tarkill Lake
Bayou
Latanier
Latanier
Lick
Bayou
LOUISIANA
AND
ARKANSAS
water



N

1 Mile
5000 Feet
0 ¼ ½ ¾ 1
0 1000 2000 3000 4000 5000
Scale 1:20000


62
N
(Joins sheet 54)
R. 4 W.
1 920 000 FEET
185 000 FEET
T. 2 N.
(Joins sheet 63)
(Joins sheet 70)
1 900 000 FEET
175 000 FEET
VERNON PARISH
BOUNDARY
FOREST
KISATCHIE
NATIONAL
FOREST
Calcasieu
River
Mineral Branch
Cypress
Hineston
Scale 1:20000
1 Mile
5000 Feet

R. 4 W. | R. 3 W.

1 925 000 FEET

(Joins sheet 55)

1 940 000 FEET

T. 2 N.

1 185 000 FEET

(Joins sheet 62)

(Joins sheet 64)

(Joins sheet 71)

KISATCHIE NATIONAL FOREST

Himeston Lookout Tower

Spring Creek

Bellamy Creek

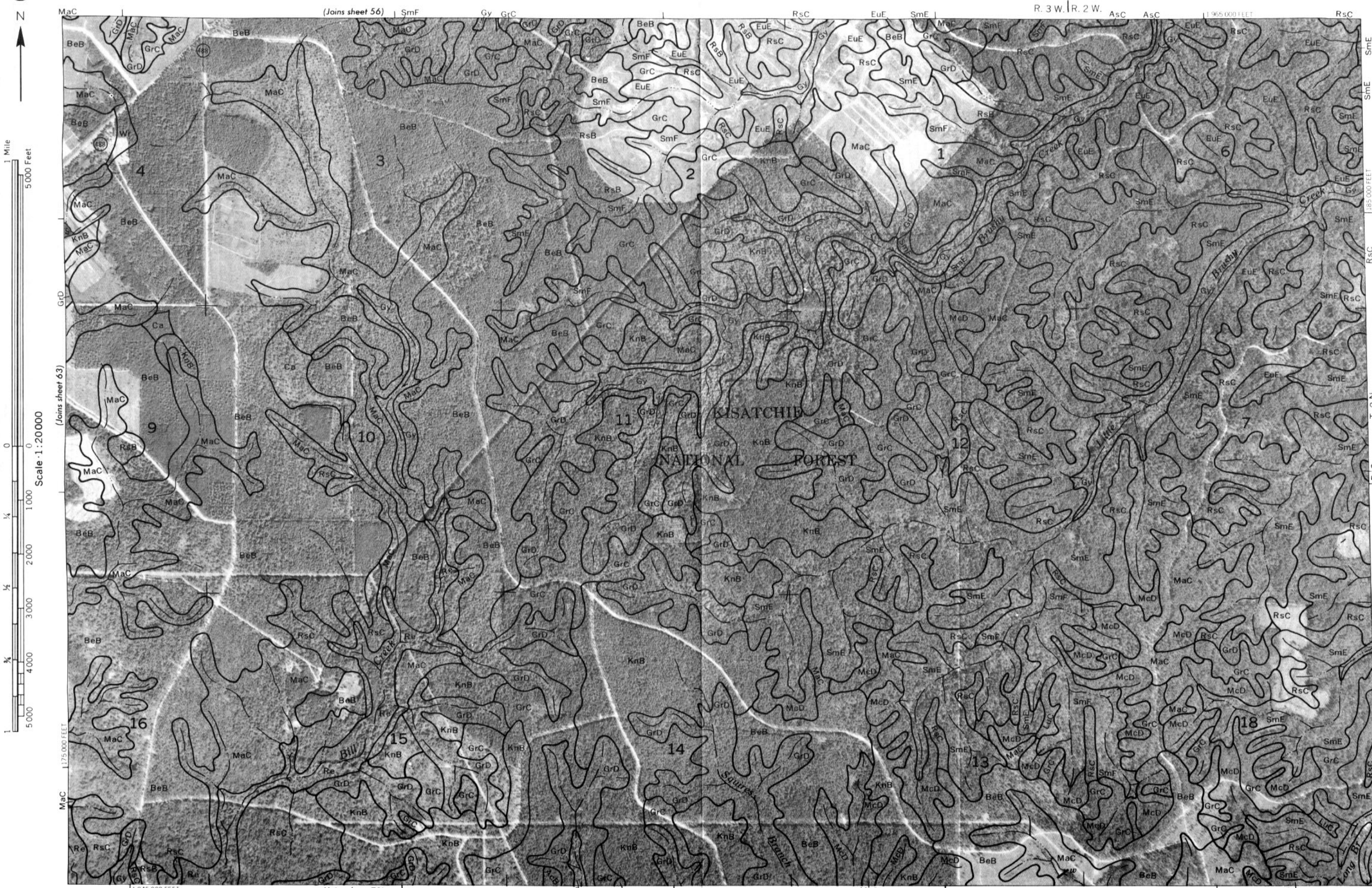
Mill Creek

N

1 Mile

5000 Feet

Scale 1:20000


N
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
¼
½
¾
1
(Joins sheet 56)
(Joins sheet 63)
(Joins sheet 65)
(Joins sheet 72)
R. 3 W. | R. 2 W.
T. 2 N.
1 965 000 FEET
185 000 FEET
175 000 FEET
1 945 000 FEET
KISATCHIE NATIONAL FOREST
Little Brushy Creek
Bill Creek
Squires Branch
Long Br.
488

R. 2 W.

T. 2 N.

1 970 000 FEET

1 990 000 FEET

185 000 FEET

175 000 FEET

(Joins sheet 57)

(Joins sheet 66)

(Joins sheet 64)

(Joins sheet 73)

KISATCHIE NATIONAL FOREST

Sand and Gravel Pit

Little Brushy Creek

Little Branch

Long Creek

Loving Creek

Little Bayou Creek

Woodworth Landing

N

1 Mile

5 000 Feet

Scale 1:20000

1 0 1 0

¼ ¼ ½ ½ ¾ ¾ 1

1 000 2 000 3 000 4 000 5 000

66

N

R. 2 W. R. 1 W.

(Joins sheet 58)

2015000 FEET

KISATCHIE NATIONAL FOREST

ALEXANDER WILDLIFE MANAGEMENT AREA

Cooley

Clear Bayou

Little Woodworth Bayou

BAYOU BOEUF

CLEAR BAYOU BOEUF

PACIFIC

MISSOURI

Woodworth

1 Mile

5000 Feet

Scale 1:20000

0 0

¼ 1000

½ 2000

¾ 3000

1 4000

1¼ 5000

175 000 FEET

1 995 000 FEET

T. 2 N.

(Joins sheet 65)

(Joins sheet 74)

(Joins sheet 67)

RAPIDES PARISH, LOUISIANA

67

N

2 020 000 FEET

R. 1 W. | R. 1 E.

(Joins sheet 59)

185 000 FEET

T. 2 N.

(Joins sheet 66)

(Joins sheet 68)

(Joins sheet 75)

2 035 000 FEET

Chambers

LOUISIANA STATE UNIVERSITY AT ALEXANDRIA

DEAN LEE AGRICULTURAL CENTER

BAYOU ROBERT

BAYOU BOEUF

Bayou Lamourie

Landing Strip

TEXAS AND PACIFIC

CANAL

CHANNEL

B. Latanier

water

(Sewage Lagoon)

Nd Nw Lc La MnA MnB MoA KnB GrD GrC Pe Gn

1 Mile

5000 Feet

Scale 1:20000


68
N
R. 1 E. R. 2 E.
(Joins sheet 60)
(Joins sheet 67)
(Joins sheet 69)
(Joins sheet 76)
2 060 000 FEET
2 040 000 FEET
185 000 FEET
175 000 FEET
T. 2 N.
Scale 1:20000
1 Mile
5000 Feet
0
1000
2000
3000
4000
5000
RED RIVER
Bayou Latanier
Elbow Lake
Compton Lake
Canal
Louisiana and Arkansas
Chatlin Lake Canal
Tiger Lake
Indian Bayou
Landing Strip
water
457
1
MnA
MoA
MnB
MdA
Nd
Nw
Lc
Gn
Ga
RnB
Rr
GrC
w
1
2
4
6
7
9
10
11
12
13
14
15
16
18
43
57
60
64
65

(Joins sheet 61)

2 065 000 FEET

R. 2 E.

185 000 FEET

T. 2 N.

(Joins sheet 68)

RED RIVER

Poland

Flog Lake

AVOYELLES PARISH

Wilson Point

LOUISIANA

ARKANSAS

Tiger

Little

(Joins sheet 77)

2 085 000 FEET

175 000 FEET

N

1 Mile

5 000 Feet

Scale · 1 : 20 000


7
N
R. 4 W.
T. 5 N.
NATCHITOCHES PARISH
(Joins sheet 2)
(Joins sheet 8)
(Joins sheet 6)
(Joins sheet 15)
Carnahan Creek
Cherry Creek
Castor
White
Sharp
water
1 Mile
5,000 Feet
Scale 1:20000
KCE
AnB
Gy
RsB
RsC
BeB
MaC
CeC
Ur
VWD


N
1 Mile
5000 Feet
Scale 1:20000
0
¼
½
¾
1
1000
2000
3000
4000
5000
(Joins sheet 62)
(Joins sheet 78)
(Joins sheet 71)
R. 4 W.
T. 2 N.
1 920 000 FEET
1 900 000 FEET
170 000 FEET
160 000 FEET
VERNON PARISH
KISATCHIE NATIONAL FOREST
Hineston
Aetman
Big Creek
Merchant Branch
Calcasieu River
Cypress Bayou
Hineston
Hathaway Branch
19
20
21
22
23
26
27
28
29
30
31
32
33
34
35
121
461
463
112

N

R. 4 W. | R. 3 W.

1 925 000 FEET

(Joins sheet 63)

T. 2 N.

KISATCHIE NATIONAL FOREST

Elmer

Spring Cr.

Mill Creek

CALCASIEU RIVER

Goodman Branch

(Joins sheet 70)

(Joins sheet 72)

(Joins sheet 79)

1 940 000 FEET

1 170 000 FEET

1 160 000 FEET

1 Mile

5,000 Feet

Scale 1:20000

N

Scale · 1 : 20000

1 Mile · 5000 Feet

0 1000 2000 3000 4000 5000

(Joins sheet 64)

(Joins sheet 71)

(Joins sheet 80)

(Joins sheet 73)

R. 3 W. | R. 2 W.

T. 2 N.

1 965 000 FEET

970 000 FEET

960 000 FEET

1 945 000 FEET

Bull Creek

Spring Creek

Squires Branch

Branch

Rocky

Sand and Gravel Pit

Melder

Cem

21 22 23 24 19 20

28 27 26 25 30 29

33 34 35 36 31 32

1 970 000 FEET

R. 2 W.

(Joins sheet 65)

170 000 FEET

T. 2 N.

(Joins sheet 72)

(Joins sheet 74)

(Joins sheet 81)

1 990 000 FEET

N

1 Mile

5000 Feet

Scale 1:20000

Sand and Gravel Pit

Sand and Gravel Pit

Hospital

Bayou

U.S.A.F. Bombing Range

Roberts Creek

Round Prairie Creek

20 21 22 23 24 25 26 27 28 29 32 33 34 35 36

N

Scale 1:20000

1 Mile 0 5000 Feet

R. 2 W. | R. 1 W.

(Joins sheet 66)

(Joins sheet 73)

(Joins sheet 75)

(Joins sheet 82)

2 015 000 FEET

1 995 000 FEET

160 000 FEET

170 000 FEET

T. 2 N.

KISATCHIE NATIONAL FOREST

ALEXANDER WILDLIFE MANAGEMENT AREA

INDIAN CREEK RESERVOIR

Bayou Clear

BAYOU BOEUF

MISSOURI PACIFIC

Sand and Gravel Pit

Woodworth Longoria Town

water

19 20 21 24 25 28 29 30 31 32 35 36 68 79 82

N

R. 1 W. | R. 1 E.

2 020 000 FEET

(Joins sheet 67)

T. 2 N.

170 000 FEET

(Joins sheet 74)

(Joins sheet 76)

(Joins sheet 83)

2 035 000 FEET

360 000 FEET

BAYOU BOEUF

Bayou Clear

Bayou Lamourie

Lamourie

ALEXANDER WILDLIFE MANAGEMENT AREA

DIVISION CHANNEL

TEXAS AND PACIFIC

Bayou Rattlesnake

Nd Nw Lc MnA MnB MoA SmE GrC GrD Pe McD KnB La Gy Ge

1 Mile 5000 Feet

Scale 1:20000

N

(Joins sheet 68)

R. 1 E. | R. 2 E.

2 060 000 FEET

170 000 FEET

T. 2 N.

(Joins sheet 75)

(Joins sheet 77)

160 000 FEET

2 040 000 FEET

(Joins sheet 84)

1 Mile 5000 Feet

Scale 1:20000

0 0 1/4 1000 1/2 2000 3/4 4000 1 5000

Bayou Lamourie

Bayou Latanier

Rattlesnake Bayou

Bayou Pompey

Wilson Bayou

Bayou Current

CHATLIN LAKE CANAL

Carpet Bayou

Bayou Rouge

21 22 23 24 19 28 27 25 30 26 33 34 35 36 32 31 57

MoA MnA MnB MdA Ga Gn Lc Nd Nw

N

2 065 000 FEET

R. 2 E.

(Joins sheet 69)

170 000 FEET

T. 2 N.

RED RIVER

RED RIVER

AVOYELLES PARISH

Roxana

Wilson Lake

Bayou Current

Tiger Lake

Wilson Bayou

Bayou Rapide

LOUISIANA AND ARKANSAS

Echo

water

(Joins sheet 76)

(Joins sheet 85)

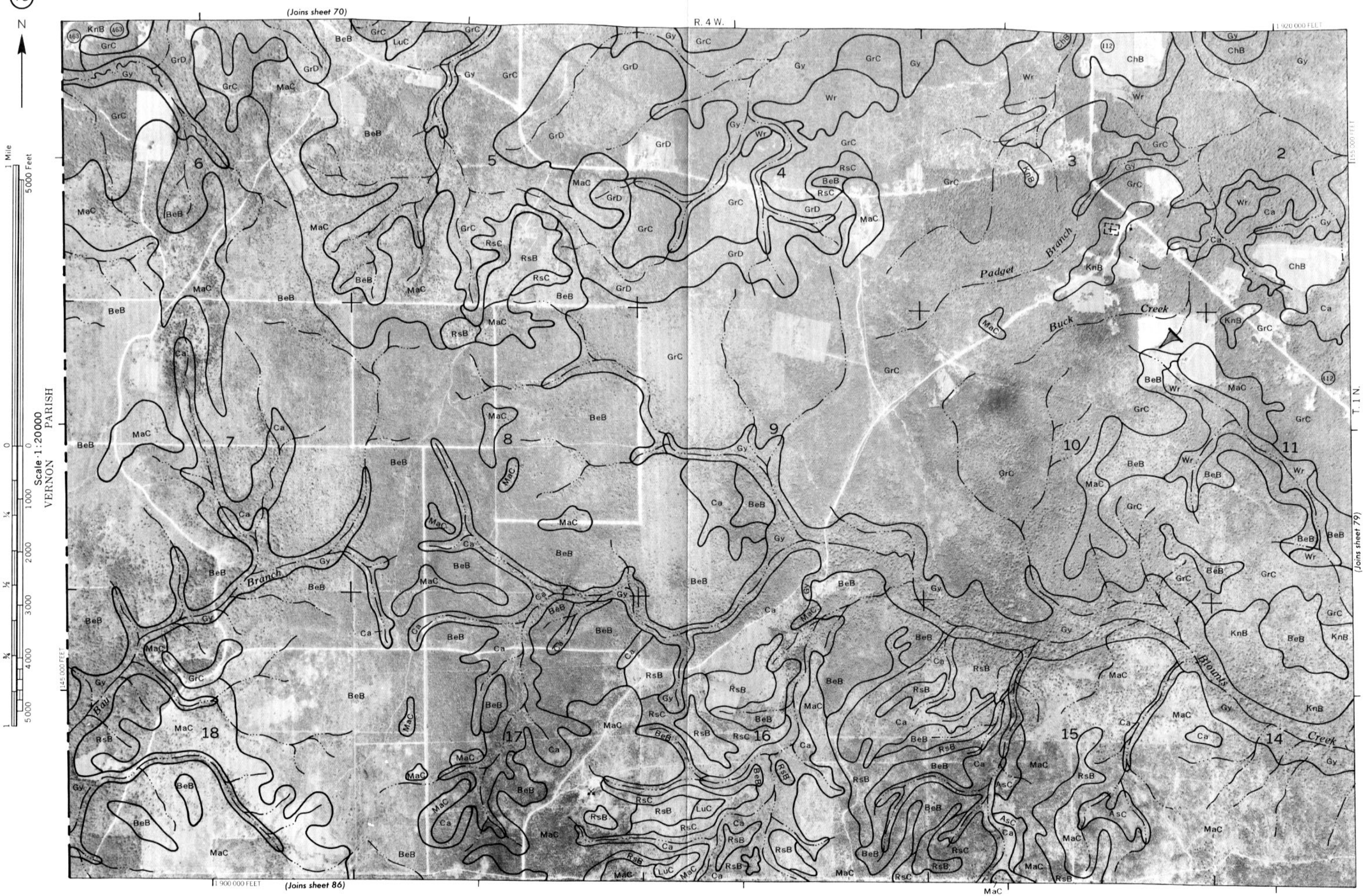
2 085 000 FEET

160 000 FEET

1 Mile

5000 Feet

Scale · 1:20000


N
(Joins sheet 70)
R. 4 W.
1 920 000 FEET
155 000 FEET
T. 1 N.
(Joins sheet 79)
(Joins sheet 86)
1 900 000 FEET
145 000 FEET
VERNON PARISH
Scale 1:20000
1 Mile
5000 Feet
Padget Branch
Buck Creek
Branch
Bay
Blounts Creek

N

1 Mile
5000 Feet
Scale 1:20000

1 925 000 FEET

R. 4 W. | R. 3 W.

(Joins sheet 71)

T. 1 N.

(Joins sheet 80)

(Joins sheet 78)

(Joins sheet 87)

1 940 000 FEET

155 000 FEET

145 000 FEET

Goodman Branch

Calcasieu

water

CALCASIEU RIVER

KISATCHIE NATIONAL FOREST

Creek

Blounts Creek

Lemeuse Creek

Mac

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

(112) (461)

Gy ChB MaC BeB RsC RsB LuC Wr Re Ca GrC KnB SmE


N
(Joins sheet 3)
R. 4 W. | R. 3 W.
1 940 000 FEET
Deloges Bluff
Shaggfoot Lake
GRANT PARISH
RED RIVER
Bayou Branch
Texas & Pacific
Zimmerman
Mill Pond
water
(Joins sheet 7)
(Joins sheet 16)
1 925 000 FEET
T. 5 N.
1 Mile
5000 Feet
Scale 1:20000

80

N

Scale 1:20000

1 Mile 5000 Feet

0 ¼ ½ ¾ 1

1000 2000 3000 4000 5000

(Joins sheet 72)

(Joins sheet 79)

(Joins sheet 88)

(Joins sheet 81)

R. 3 W. | R. 2 W.

T. 1 N.

1 965 000 FEET

1 955 000 FEET

1 945 000 FEET

Rocky Branch

Creek

Lemeuse Creek

Roaring Creek

Spring Creek

Mill Creek

Campground Cr

Sand and Gravel Pit

water

BeB Beauregard silt loam, 0 to 3 percent slopes

Ca Calhoun silt loam

ChB Chastain silt loam, 1 to 3 percent slopes

EuC Eustis fine sand, 3 to 8 percent slopes

EuE Eustis fine sand, 8 to 20 percent slopes

GrC Gore silt loam, 3 to 8 percent slopes

GrD Gore silt loam, 8 to 12 percent slopes

Gy Gullied land

KnB Kisatchie fine sandy loam, 1 to 5 percent slopes

LuC Luverne fine sandy loam, 3 to 8 percent slopes

LuG Luverne fine sandy loam, 20 to 40 percent slopes

MaC Malbis fine sandy loam, 3 to 8 percent slopes

Re Ruston fine sandy loam

RsB Ruston fine sandy loam, 1 to 5 percent slopes

RsC Ruston fine sandy loam, 5 to 8 percent slopes

SmE Smithdale fine sandy loam, 8 to 20 percent slopes

N

1 Mile
5000 Feet

Scale 1:20000

1 970 000 FEET

1 990 000 FEET

155 000 FEET

145 000 FEET

R. 2 W.

T. 1 N.

U.S.A.F. Bombing Range

KISATCHIE NATIONAL FOREST

Roaring Creek

Indian Creek

Harper Branch

Perkins Creek

Barbo Creek

Mill Creek

(Joins sheet 73)

(Joins sheet 82)

(Joins sheet 80)

(Joins sheet 89)

82

N

R. 2 W.

R. 1 W.

(Joins sheet 74)

T. 1 N.

(Joins sheet 83)

(Joins sheet 81)

(Joins sheet 90)

Scale 1:20000

1 Mile

5000 Feet

KISATCHIE NATIONAL FOREST

INDIAN CREEK RESERVOIR

ALEXANDER WILDLIFE MANAGEMENT AREA

ALEXANDER STATE FOREST

Bringhurst

Midway

Burgess Creek

MISSOURI PACIFIC

Sand and Gravel Pit

water

MaC RsC RsB BeB Gy Re SmE GrC KnB AcA AcB Wr ChB Ca

N

2 020 000 FEET

R. 1 W. | R. 1 E.

(Joins sheet 75)

155 000 FEET

T. 1 N.

(Joins sheet 82)

(Joins sheet 84)

145 000 FEET

(Joins sheet 91)

2 035 000 FEET

BAYOU BOEUF

Hardy Lake

Weems Lake

Lecompte

Meeker

Calahan Bayou

CHICAGO ROCK ISLAND AND PACIFIC

TEXAS AND PACIFIC

COCODRIE DIVISION CHANNEL

1 Mile

5 000 Feet

Scale 1:20000

N

1 Mile

5000 Feet

Scale 1:20000

(Joins sheet 76)

(Joins sheet 83)

(Joins sheet 92)

(Joins sheet 85)

R. 1 E. R. 2 E.

T. 1 N.

2 060 000 FEET

2 040 000 FEET

145 000 FEET

155 000 FEET

Calahan Bayou

Bayou Cowhead

Bayou Sans

CHATLIN LAKE CANAL

water

MoA MnA Nd Nw Lc

1 2 3 4 6 7 10 12 13 18

71 167

N

2 065 000 FEET

R. 2 E.

(Joins sheet 77)

155 000 FEET

T. 1 N.

(Joins sheet 84)

145 000 FEET

(Joins sheet 93)

2 085 000 FEET

Bayou Rouge

CHATLIN LAKE CANAL

Coulee du Pochaur

AVOYELLES PARISH

water

MoA

MrA

MnA

Nw

McD

GrC

Lc

w

1 Mile

5000 Feet

Scale 1:20000

86

N

1 Mile

5,000 Feet

Scale 1:20000

VERNON PARISH

(Joins sheet 78)

R. 4 W.

1,920,000 FEET

41,000 FEET

T. 1 N.

1,900,000 FEET

30,000 FEET

(Joins sheet 94)

(Joins sheet 87)

Tennille Creek

Rocky Branch

Creek

Steele Branch

Chenneyville Ghosh

19 20 21 22 23

30 29 28 27 26

31 32 33 34 35

BeB MaC RsB RsC GrC GrD Gy LuC Ca AsC SmE AcB KnB

1 925 000 FEET

R. 4 W. | R. 3 W.

(Joins sheet 79)

1 940 000 FEET

T. 1 N.

(Joins sheet 86)

(Joins sheet 88)

(Joins sheet 95)

Roofy Branch

Lemeuse Creek

CASCASIEU RIVER

Sandy Branch

Prairie Branch

KISATCHIE NATIONAL FOREST

N

1 Mile

5000 Feet

Scale 1:20000

1 0 0 1/4 1/2 3/4 1

5 000 4 000 3 000 2 000 1 000

125 000 FEET

88

N

Scale 1:20000

1 Mile 5,000 Feet

(Joins sheet 80)

(Joins sheet 87)

(Joins sheet 89)

(Joins sheet 96)

R. 3 W. | R. 2 W.

T. 1 N.

1,965,000 FEET

1,945,000 FEET

125,000 FEET

Campground Creek

Germany Creek

Spring Creek

Sunset Lookout Tower

Gy

N

1 970 000 FEET

140 000 FEET

R. 2 W.

T. 1 N.

(Joins sheet 81)

(Joins sheet 88)

(Joins sheet 90)

(Joins sheet 97)

1 990 000 FEET

1 925 000 FEET

KISATCHIE NATIONAL FOREST

Forest Hill

Sand and Gravel Pit

Sand and Gravel Pit

water

Perkins Creek

Barber Creek

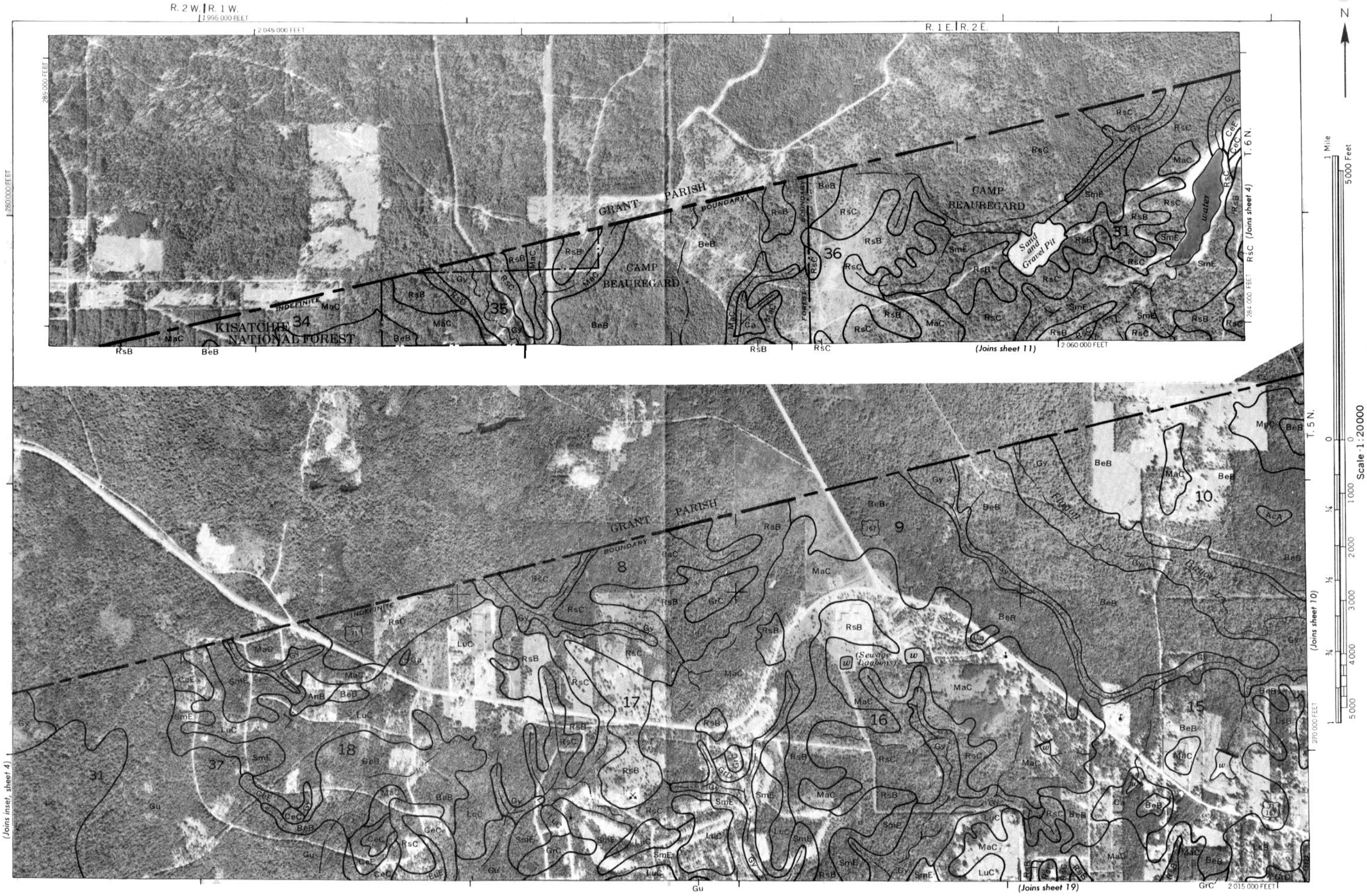
Spring Creek

MISSOURI PACIFIC

1 Mile

5 000 Feet

Scale 1:20000


R. 2 W. | R. 1 W.
1 995 000 FEET
2 045 000 FEET
R. 1 E. | R. 2 E.
289 000 FEET
280 000 FEET
T. 6 N.
T. 5 N.
GRANT PARISH BOUNDARY
INDEFINITE
KISATCHIE NATIONAL FOREST
CAMP BEAUREGARD
FOREST BOUNDARY
Sand and Gravel Pit
water
Bayou
Flagon
(Sewage Lagoons)
34
35
36
31
8
9
10
17
18
16
15
37
284 000 FEET
270 000 FEET
2 060 000 FEET
2 015 000 FEET
(Joins sheet 4)
(Joins sheet 11)
(Joins sheet 10)
(Joins sheet 19)
(Joins inset, sheet 4)
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000

90

N

R. 2 W. R. 1 W.

T. 1 N.

2 015 000 FEET

140 000 FEET

1 995 000 FEET

125 000 FEET

1 Mile 5000 Feet

Scale 1:20000

(Joins sheet 82)

(Joins sheet 89)

(Joins sheet 91)

(Joins sheet 98)

water

w Sand and Gravel Pit

Cockrell Creek

Marshall Creek

Stoop Creek

Hurricane Creek

Panther Creek

Choctaw Creek

R. 1 W. | R. 1 E.

2 020 000 FEET

(Joins sheet 83)

T. 1 N.

(Joins sheet 90)

(Joins sheet 92)

(Joins sheet 99)

2 035 000 FEET

140 000 FEET

25 000 FEET

N

Scale 1:20000

1 Mile

5000 Feet

Beaver Creek

Cockrell Creek

Marshall Crk

Beaver Creek Swamp

COCODRIE LAKE

BAYOU BOEUF

COCODRIE DIVISION CHANNEL

23 26 25 30 31 36 35 29 6 32 33

92

N

Scale 1:20000

1 Mile 5000 Feet

0 0

¼ 1000

½ 2000

¾ 3000

1 4000

5000

(Joins sheet 84)

(Joins sheet 91)

(Joins sheet 93)

(Joins sheet 100)

R. 1 E. R. 2 E.

T. 1 N.

2 060 000 FEET

140 000 FEET

125 000 FEET

2 040 000 FEET

BAYOU BOEUF

TEXAS AND PACIFIC

BAYOU BOEUF DIVISION CHANNEL

COOBRIE

Nd Nw Lc La MnA

6 19 52 29 30 31 33 34 26 27 35 36 37 38 51

2 065 000 FEET

R. 2 E.

(Joins sheet 85)

140 000 FEET

T. 1 N.

(Joins sheet 92)

(Joins inset, sheet 61)

125 000 FEET

2 085 000 FEET

(100) (Joins sheet 101)

N

1 Mile

5000 Feet

Scale 1:20000

Lc Nw MrA Nd MoA MdA MnA MnB water

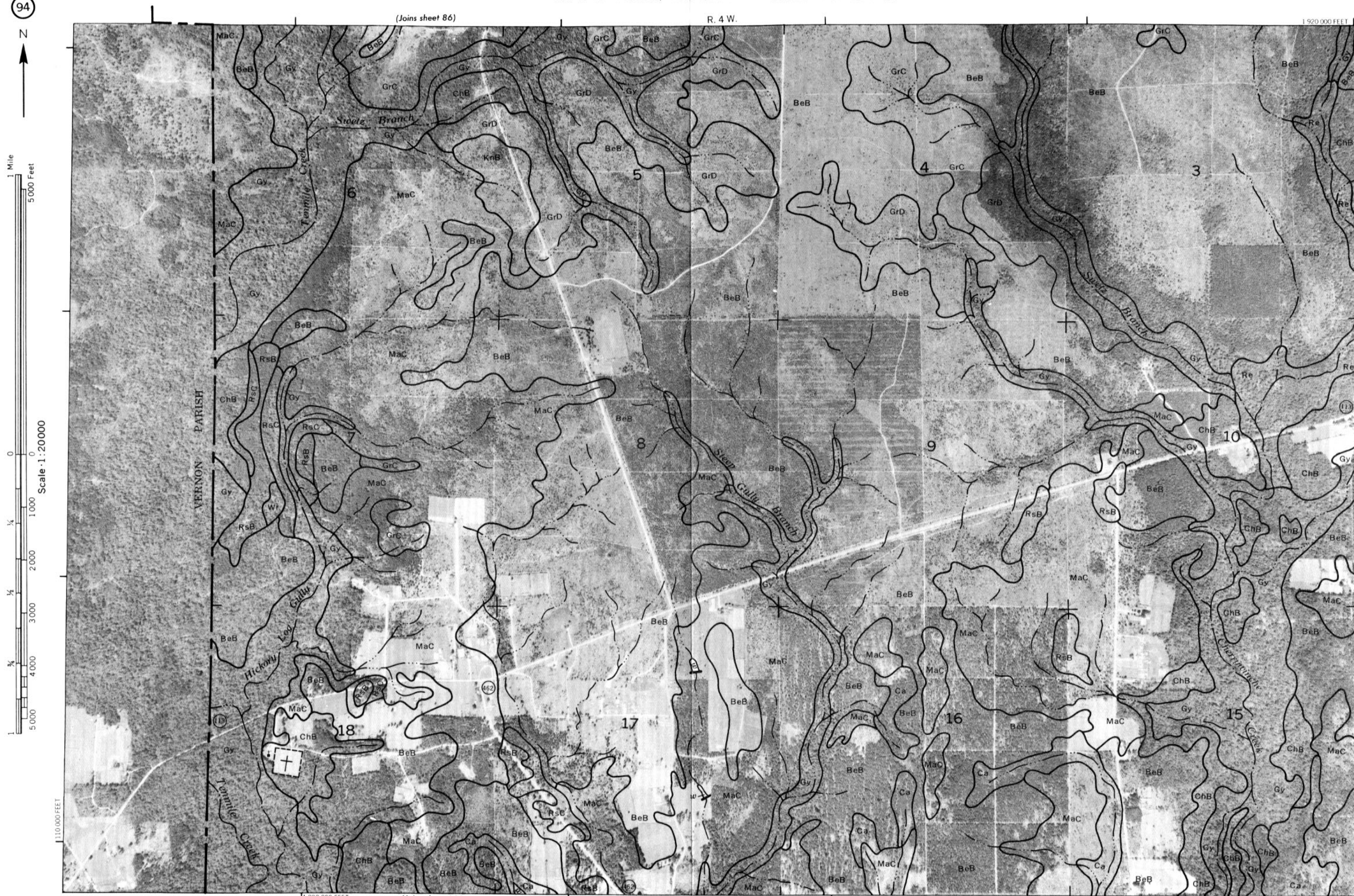
52 21 20 22 23 24 45 48 46 50 47 49 29 42 44 39 41 40 32 33 34 43 53

Bayou Boeuf

BAYOU BOEUF

Cheneyville

71 181


N
1 Mile
5 000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
(Joins sheet 86)
R. 4 W.
1 920 000 FEET
125 000 FEET
T. 1 S.
(Joins sheet 95)
(Joins sheet 102)
1 900 000 FEET
110 000 FEET
VERNON PARISH
Sweets Branch
Tenmile Creek
Hickory Log Gully
Steep Gully Branch
Cherrywinche Creek
3
4
5
6
7
8
9
10
15
16
17
18
113
462
MaC
BeB
Gy
GrC
GrD
ChB
KnB
RsB
RsC
Re
Ca
W

(Joins sheet 86) (Joins sheet 87)

1 925 000 FEET

R. 4 W. | R. 3 W.

125 000 FEET

T. 1 S.

(Joins sheet 94)

(Joins sheet 96)

(Joins sheet 103)

1 940 000 FEET

N

1 Mile

5000 Feet

Scale 1:20000

Union Hill

KISATCHIE NATIONAL FOREST

CALCASIEU RIVER

Prattie Branch

Cherrytinnche Cr.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

BeB RsB RsC MaC ChB Gy Wr Ca LuC AcB

N

(Joins sheet 88)

R. 3 W. | R. 2 W.

1 965 000 FEET

T. 1 S.

(Joins sheet 95)

(Joins sheet 97)

KISATCHIE NATIONAL FOREST

1 945 000 FEET

(Joins sheet 104)

Scale 1:20000

1 Mile 5000 Feet

N

1 970 000 FEET

R. 2 W.

(Joins sheet 89)

T. 1 S.

(Joins sheet 96)

(Joins sheet 98)

(Joins sheet 105)

1 990 000 FEET

Lake Hop-o-Bee

Lake Jubenicwa

Longleaf

McNary

Glenmora

KISATCHIE NATIONAL FOREST

Little Spring Creek

Sand and Gravel Pit

PACIFIC

MISSOURI

1 Mile

5,000 Feet

Scale 1:20000

98

N

R. 2 W. R. 1 W.

(Joins sheet 90)

2 015 000 FEET

T. 1 S.

120 000 FEET

(Joins sheet 97)

(Joins sheet 99)

1 995 000 FEET

(Joins sheet 106)

1 Mile

5000 Feet

Scale 1:20000

Hurricane Creek

Tanner Creek

Little Spring Creek

Peachtree Island

COCODRIE LAKE

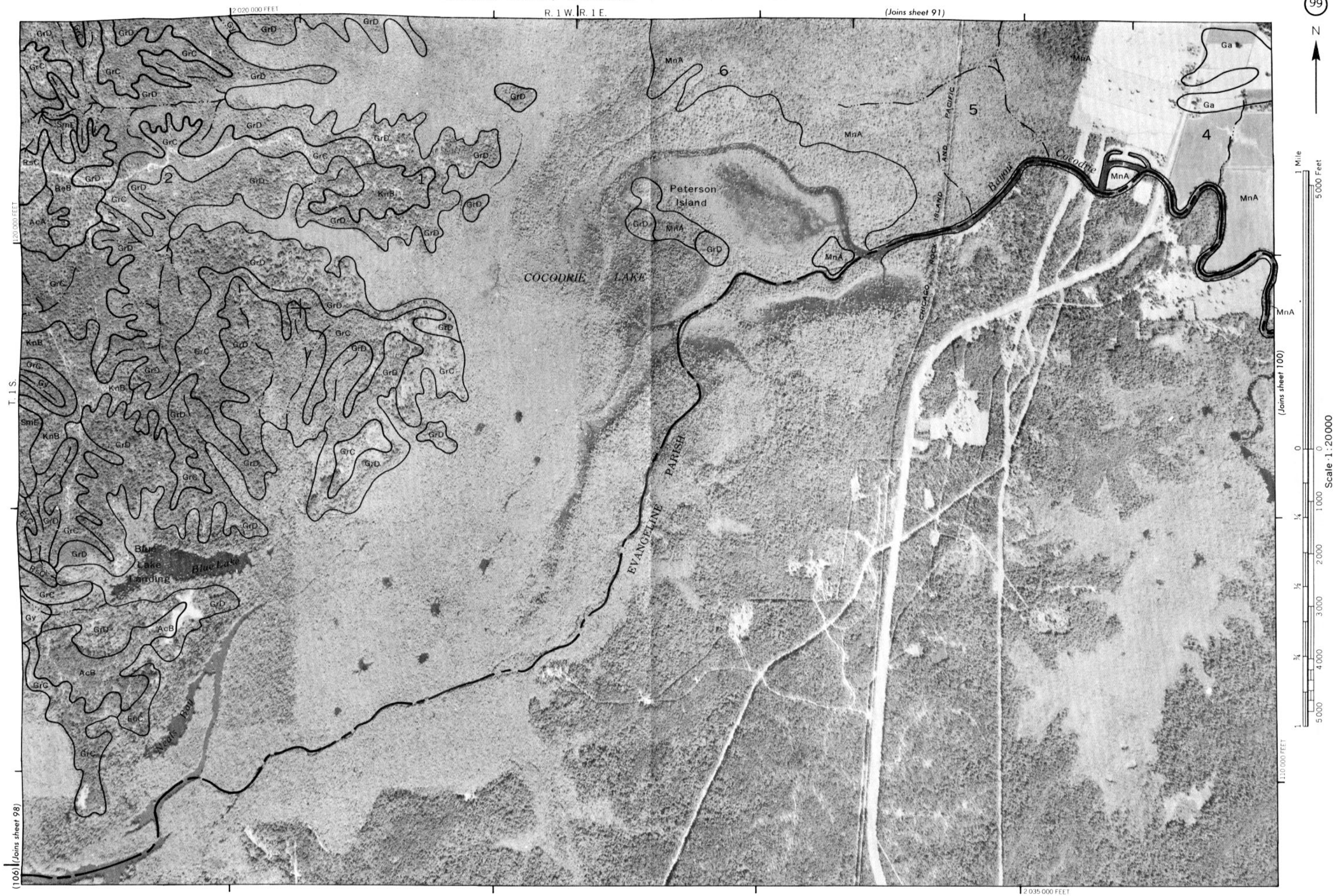
COCODRIE LAKE

Clubhouse Landing

Bennett Bay

1 2 3 4 5 6 7 8 9 10 11 12 13 15 16 17 18

RsC RsB MaC BeB GrD KnB Gy SmE SmF LuC EuE ChB EuC Ca AnB GrC AcA


2 020 000 FEET
R. 1 W. R. 1 E.
(Joins sheet 91)
N
1 Mile
5000 Feet
0
0
1000
2000
3000
4000
5000
Scale 1:20 000
(Joins sheet 100)
2 035 000 FEET
110 000 FEET
120 000 FEET
T. 1 S.
(Joins sheet 98)
(106)
COCODRIE LAKE
Peterson Island
Bayou Cocodrie
CHICAGO, ROCK ISLAND AND PACIFIC
EVANGELINE PARISH
Blue Lake Landing
Blue Lake
1
2
4
5
6
GrD
GrC
KnB
MnA
Ga
AcB
AcA
BeB
SmE
RsC
Gy

SOIL LEGEND

The first letter, always a capital, is the initial letter of the soil name. The second letter is a capital if the mapping unit is broadly defined 1/; otherwise, it is a small letter. The third letter, always a capital, shows the slope. Symbols without a slope letter are those of nearly level soils.

SYMBOL	NAME
AcA	Acadia silt loam, 0 to 1 percent slopes
AcB	Acadia silt loam, 1 to 3 percent slopes
AL	Alligator association, frequently flooded
AnB	Anacoca silt loam, 1 to 4 percent slopes
AsC	Aqualfs, 1 to 8 percent slopes
BeB	Beauregard silt loam, 1 to 3 percent slopes
Ca	Caddo silt loam
CeC	Cadeville very fine sandy loam, 1 to 5 percent slopes
CeE	Cadeville very fine sandy loam, 5 to 20 percent slopes
ChB	Cahaba fine sandy loam, 1 to 3 percent slopes
Cr	Crowley silt loam
EuC	Eustis loamy fine sand, 1 to 8 percent slopes
EuE	Eustis loamy fine sand, 8 to 30 percent slopes
Fo	Foley silt loam, occasionally flooded
Ga	Gallion silt loam
Gn	Gallion silty clay loam
GoB	Glenmora silt loam, 1 to 3 percent slopes
GrC	Gore very fine sandy loam, 1 to 5 percent slopes
GrD	Gore very fine sandy loam, 5 to 12 percent slopes
Gu	Guyton complex
Gy	Guyton complex, frequently flooded
KCE	Kisatchie-Cadeville association, hilly
KnB	Kolin silt loam, 1 to 5 percent slopes
La	Latanier silty clay loam
Lc	Latanier clay
LsB	Libuse silt loam, 1 to 5 percent slopes
LuC	Lucy loamy fine sand, 3 to 8 percent slopes
MaC	Malbis fine sandy loam, 1 to 5 percent slopes
McC	McKamie very fine sandy loam, 1 to 5 percent slopes
McD	McKamie very fine sandy loam, 5 to 12 percent slopes
MdA	Moreland silty clay loam, 0 to 1 percent slopes
MnA	Moreland clay, 0 to 1 percent slopes
MnB	Moreland clay, gently undulating
MoA	Moreland clay,0 to 1 percent slopes, occasionally flooded
MrA	Moreland clay, 0 to 1 percent slopes, frequently flooded
MsC	Morse clay, 1 to 5 percent slopes
Mw	Mowata silt loam
Nd	Norwood silt loam
Nw	Norwood silty clay loam
Pa	Paleudalfs
Pe	Perry clay, frequently flooded
Re	Rexor-Nugent complex, frequently flooded
RnB	Roxana very fine sandy loam, gently undulating
Ro	Roxana very fine sandy loam, occasionally flooded
Rr	Roxana soils, frequently flooded
RsB	Ruston fine sandy loam, 1 to 3 percent slopes
RsC	Ruston fine sandy loam, 3 to 8 percent slopes
SmE	Smithdale fine sandy loam, 8 to 12 percent slopes
SmF	Smithdale fine sandy loam, 12 to 20 percent slopes
Ur	Urbo silty clay loam, frequently flooded
VWD	Vaiden-Watsonia association, rolling
Wr	Wrightsville silt loam

1/ The composition of these units is more variable than that of others in the survey area but has been controlled well enough to be interpreted for the expected use of the soils.

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline
- AD HOC BOUNDARY (label)
- Small airport, airfield, park, oilfield, cemetery, or flood pool (Davis Airstrip; FLOOD POOL LINE)
- STATE COORDINATE TICK
- LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEMS & DESIGNATIONS

- Interstate (79)
- Federal (410)
- State (52)
- County, farm or ranch (378)

- RAILROAD
- POWER TRANSMISSION LINE (normally not shown)
- PIPE LINE (normally not shown)
- FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small (water; w)

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) (Indian Mound)
- Located object (label) (Tower)
- Tank (label) (GAS)
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) (CANAL)
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial (water; w)
- Intermittent (int; i)

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS (CeA; FoB2)

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

- SHORT STEEP SLOPE
- GULLY
- DEPRESSION OR SINK
- SOIL SAMPLE SITE (normally not shown)

MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot